A 20-year-old man from Italy, previously fit and well, is admitted to hospital with jaundice. He had recently been commenced on antibiotics by a general practitioner (GP) for a presumed urinary tract infection.

Examination reveals jaundice, and a spleen tip is just palpable under the left costal margin.

Investigations:

Hb	9.3 g/dl
WCC	14 × 10^9/l
PLT	290 × 10^9/l
Na+	147 mmol/l
K+	4.3 mmol/l
Creatinine	85 µmol/l
Urea	7.2 mmol/l
Bilirubin	72 µmol/l
ALP	80 U/l
ALT	28 U/l
Albumin	39 g/dl
Blood film	Heinz bodies
Urine dipstick	Positive for urobilinogen and leukocyte esterase

What antibiotic is most appropriate for treating this patient?

A Chloramphenicol

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Blood film	Heinz bodies
Urine dipstick	Positive for urobilinogen and leukocyte esterase

What antibiotic is most appropriate for treating this patient?

A	Chloramphenicol
B	Nitrofurantoin
C	Ciprofloxacin
D	Co-amoxiclav
E	Co-trimoxazole

D Co-amoxiclav

The patient has glucose-6-phoshate dehydrogenase (G6PD) deficiency, and Heinz bodies are the give-away here. The enzyme is required in the body for the conversion of glucose-6-phosphate to 6-phosphogluconolactone. This step is part of the hexose monophosphate pathway, needed for the generation of NADPH (reduced nicotinamide dinucleotide phosphate). NADPH maintains glutathione in a reduced form, which is required for the removal of oxidative metabolites.

Deficiency of this enzyme shows X-linked inheritance and results in haemolysis when the patient is exposed to oxidants.

A Chloramphenicol

Chloramphenicol leads to haemolysis in G6PD deficiency and should be avoided. It is now mainly used for infections such as Salmonella that are resistant to multiple other antibiotics.

B Nitrofurantoin

Although nitrofurantoin is effective in treating UTIs, it should be avoided in patients with G6PD deficiency.

C Ciprofloxacin

Urinary pathogens are exhibiting significant levels of resistance to quinolones, and they are a class that should be avoided in patients with G6PD deficiency.

E Co-trimoxazole

Co-trimoxazole is usually reserved for treatment of pneumocystis pneumonia, and is avoided in patients with

An unknown middle-aged man has been brought into the Emergency Department, having been found collapsed in the street. He has a suicide note in his pocket, along with a quantity of various loose tablets.

One of the nursing staff recognises that some of the tablets are temazepam and others may be amitriptyline. His Glasgow Coma Scale (GCS) score is 9. Pupils are dilated, blood pressure (BP) is 122/82, pulse is 72 and regular and a finger-prick glucose is 5.6 mmol/l. His O_2 sats measured by probe are 90%. Electrocardiogram (ECG) reveals a QRS of 90 ms.

What would the next optimal treatment be?

A Intravenous (iv) sodium bicarbonate

B iv flumazenil

C iv naloxone

D Airway protection

E iv glucagon

D Airway protection

We are unaware of the time lapse since this patient took his overdose, and the relative contribution of benzodiazepines versus amitriptyline to his conscious level. As such, the most appropriate next intervention is protection of his airway, particularly as the GCS is significantly reduced at 9 and benzodiazepine reversal agents are contraindicated here.

A Intravenous (iv) sodium bicarbonate

Sodium bicarbonate is indicated in tricyclic antidepressant overdose when the QRS is greater than 100 ms, to reduce the risk of seizures and ventricular arrhythmia.

B iv flumazenil

Flumazenil is indicated only for acute overdose of benzodiazepines where there is no history of either chronic use of the class of medication or concomitant use of tricyclic antidepressants because of the risk of inducing seizures.

C iv naloxone

iv naloxone is a reversal agent for opiates, not for benzodiazepines.

E iv glucagon

iv glucagon used at high dose is a reversal agent in those patients who have taken an overdose of beta blockers.

A 34-year-old taxi driver is admitted to your ward having taken a mixed overdose. His partner is en route to the hospital with the empty packets and bottles. Your house officer questions whether the use of multiple-dose activated charcoal could be used.

For which of the following overdoses is multiple-dose activated charcoal most useful?

A Paraquat

B Ferrous sulphate

C Ethylene glycol

D Carbamazepine

E Lithium carbonate

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For which of the following overdoses is multiple-dose activated charcoal most useful?

Your answer was incorrect

A Paraquat

B Ferrous sulphate

C Ethylene glycol

D Carbamazepine

E Lithium carbonate

Explanation

D Carbamazepine

Delayed gastric emptying is recognised in carbamazepine overdose, and multiple-dose activated charcoal is therefore a useful option. Repeated administration prevents delayed absorption of carbamazepine and is associated with improved outcomes. Other agents where multiple doses of activated charcoal can be given include dapsone, phenobarbitone, digoxin, theophylline and quinine.

Rana Alnasser's screen

D Carbamazepine

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C Ethylene glycol

Activated charcoal is not of value in the treatment of methanol or ethylene glycol administration. The most important step here is inhibition of alcohol dehydrogenase, either with ethanol itself or fomepizole.

A Paraquat

Minimal amounts of paraquat are fatal when ingested; administration of Fuller's earth may reduce absorption, although activated charcoal has no role at all in the treatment of paraquat overdose.

B Ferrous sulphate

Ferrous sulphate does not have significant binding to activated charcoal. Removal of tablets via gastric lavage or whole-bowel irrigation are important potential options for treatment.

E Lithium carbonate

Activated charcoal has no impact on absorption of charged particles such as lithium and is therefore not the correct answer here. Where there is significant lithium overdose, haemodialysis is considered.

Having taken several handfuls of aspirin tablets 4 h previously, a 45-year-old woman attends her local Emergency Department. She has symptoms of salicylism, with hyperventilation, sweating and tinnitus.

Which of the following is most appropriate to enhance the elimination of salicylate?

- A Single-dose oral activated charcoal
- B Sodium bicarbonate IV
- C Forced alkaline diuresis
- D Urinary acidification
- E Oral ipecacuanha

7567

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C	Forced alkaline diuresis
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Explanation

B	Sodium bicarbonate IV

Alkalinisation of the urine can be achieved by the administration of 1.5 l of 1.26% sodium bicarbonate IV over 3 h. If the urinary pH is increased from 5 to 8, the elimination of salicylate is increased up to a factor of 12. In this alkaline environment, the weakly acidic salicylate tends to become ionised and not resorbed from the tubular fluid.

C Forced alkaline diuresis

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C Forced alkaline diuresis

Forced alkaline diuresis can drive marked fluid shifts and may exacerbate the risk of pulmonary oedema, and for this reason it is best avoided here.

A Single-dose oral activated charcoal

Activated charcoal is usually given within 1 h of overdose to reduce drug absorption and multiple doses may increase elimination, although given the elapsed time here it's likely that urinary alkalinisation will be the more effective of the two.

D Urinary acidification

Urinary acidification is not used in the treatment of salicylic acid, which is already an acid. Urinary alkalinisation is, however, effective.

E Oral ipecacuanha

Administration of agents that drive vomiting, such as ipecacuanha, should be avoided here.

A 28-year-old man presents to A&E with a history of chest pain. He describes a burning retrosternal pain which is precipitated by heavy meals and worse on lying down. He denies any dysphagia, nausea, vomiting or haematemesis. His bowels are regular and there is no history of melaena. He has no past medical history or family history of note. There is a 30 units per week history of alcohol consumption.

On examination, he is comfortable, his pulse is 70 bpm and regular, heart sounds are normal and his chest is clear. His abdomen is soft and non-tender, with no masses or organomegaly. He has normal bowel sounds, and rectal examination reveals no blood, melaena or masses. Routine bloods, including a haemoglobin, are entirely normal. He plans to reduce his alcohol intake.

What is the most appropriate next step in management?

A Oesophago-gastro-duodenoscopy (OGD)

B Omeprazole 20 mg daily, clarithromycin 500 mg twice daily, and amoxicillin 1 g twice daily for one week

C Omeprazole 40 mg daily for month

D Barium swallow

E Urea breath test

Question 5 of 218

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Rana Alnasser's screen

C Omeprazole 40 mg daily for month

This patient has symptoms of heartburn without any sinister symptoms such as vomiting, bleeding, weight loss, abdominal mass or dysphagia. He is also very young at the age of 28. In this case the optimal intervention is lifestyle advice, including advice on healthy eating, weight reduction, alcohol reduction, smoking cessation and promotion of antacid/alginate use. Full-dose proton pump inhibitor (PPI) for one month can also be considered.

A Oesophago-gastro-duodenoscopy (OGD)

Patients under the age of 55 without any significant alarm features do not require referral for endoscopy.

B Omeprazole 20 mg daily, clarithromycin 500 mg twice daily, and amoxicillin 1 g twice daily for one week

Helicobacter pylori eradication therapy is only required where presence of *H. pylori* is proven.

D Barium swallow

There are no significant features to suggest oesophageal obstruction; barium swallow is therefore not required.

E Urea breath test

If there is no response or relapse after PPI therapy, patients should have a test for *H. pylori* by carbon-13 urea breath test or stool antigen test, and subsequent eradication if necessary.

A 30-year-old man is admitted one evening by the local out-of-hours general practitioner (GP). Although not his patient, he is able to tell you that the man has a history of schizophrenia, and has recently had his medications altered.

Clinically, he has evidence of a lower respiratory tract infection, and bloods taken earlier that day indicate a neutropenic picture.

What is the most likely causative agent?

A	Olanzapine
B	Clozapine
C	Risperidone
D	Sulpiride
E	Prochlorperazine

Explanation

B	Clozapine

Clozapine is an atypical antipsychotic used in the treatment of schizophrenia, and in patients who are intolerant to, or unresponsive to, other antipsychotics. Many antipsychotic drugs can cause bone marrow depression, but agranulocytosis is particularly associated with clozapine. The patient's leucocyte count and differential should be taken prior to its commencement, and at regular intervals thereafter. Agranulocytosis is seen in up to 32/100,000 weeks of observation within the first 18 weeks of therapy for patients treated with the drug.

A	Olanzapine

Although decreases in white cell count are reported as common, reports of agranulocytosis exist as case reports only versus the quantified risk versus exposure identified for clozapine.

C	Risperidone

Like olanazapine, agranulocytosis was not reported in clinical trials for risperidone but was reported in post-marketing case reports.

D	Sulpiride

Like other anti-psychotics, agranulocytosis is reported but not commonly enough to estimate an exposure-response relationship.

E	Prochlorperazine

is used for the treatment of

A 32-year-old man with rheumatoid arthritis and bipolar disorder is brought to the Emergency Department complaining of bilateral deafness, tinnitus and blurred vision. These symptoms had started 3 h ago.

He is vomiting repeatedly on arrival in the Emergency Department and is restless, sweating and dehydrated. Respiratory rate is 34/min. His blood pressure is 102/70 mmHg and pulse is 86 and regular. His GCS is 13.

Investigations:

WCC	12 × 10^9/l
Hb	12 g/dl
Na^+	135 mmol/l
K^+	2.3 mmol/l

Arterial blood gases initially reveal:

pH	7.64
$paCO_2$	2.8 kPa
HCO_3^-	22 mmol/l
Chloride	90 mmol/l

and some 3 h later:

pH	7.3
$paCO_2$	2.8 kPa
HCO_3^-	10 mmol/l

What is the most likely underlying diagnosis?

A	Ethylene glycol poisoning
B	Metformin poisoning

Question 7 of 218

Investigations:

WCC	12 × 10^9/l
Hb	12 g/dl
Na^+	135 mmol/l
K^+	2.3 mmol/l

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Your answer was correct

A	Ethylene glycol poisoning
B	Metformin poisoning
C	Naproxen poisoning
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Explanation

D Salicylate poisoning

This patient presented with bilateral deafness, tinnitus, visual blurring, repeated vomiting and initially had respiratory alkalosis followed by severe metabolic acidosis with an increased anion gap. These features are typical of salicylate poisoning.

Increased anion gap metabolic acidosis occurs is several conditions which include
(1) diabetic ketoacidosis;
(2) methanol overdose;
(3) ethylene glycol poisoning;
(4) lactic acidosis;
(5) salicylate poisoning.

It is calculated by the formula:

anion gap = plasma ([sodium] + [potassium]) - ([chloride] + [bicarbonate])

Normal values in health range between 8 and 14 mmol/l; in this patient the anion gap is 25 mmol/l.
Fluid resuscitation and urinary alkalinisation are mainstays of management for salicylate poisoning; in severe cases, where plasma concentration is >700 mg/l, haemodialysis may be considered. Indications for haemodialysis include:

- kidney disease
- congestive cardiac failure
- non-cardiogenic pulmonary oedema
- coma convulsions CNS effects not resolved by correction of acidosis
- persistently high salicylate concentrations unresponsive to urinary alkalinisation
- severe metabolic acidosis (pH <7.2).

A Ethylene glycol poisoning

Ethylene glycol poisoning is associated with a raised anion

A Ethylene glycol poisoning

Ethylene glycol poisoning is associated with a raised anion gap metabolic acidosis, but tinnitus and deafness are not features of ethylene glycol poisoning.

B Metformin poisoning

Metformin is associated with raised anion gap metabolic acidosis, but again is not associated with tinnitus.

C Naproxen poisoning

Naproxen poisoning is associated with headache, nausea, vomiting and epigastric pain, but is less likely to be associated with tinnitus compared to aspirin overdose

E Sulfasalazine poisoning

Sulfasalazine is associated with very low levels of acute toxicity in overdose.

Question 8 of 218

A 26-year-old man is prescribed thalidomide for erythema nodosum that has been resistant to other therapeutic interventions. He has recently acquired a new female partner and asks about contraceptive advice.

Which of the following represents the correct advice with respect to contraception?

- A No precautions are needed as thalidomide only represents a risk if it is taken by the female partner
- B He should use barrier contraception and his partner should use effective contraception
- C Only the female need use contraception
- D The male should refrain from starting a family for 3 years after using thalidomide
- E Thalidomide is only teratogenic in the last trimester of pregnancy

B He should use barrier contraception and his partner should use effective contraception

Thalidomide can be transferred in semen and, as such, males should be advised to use barrier contraception until at least 1 week after cessation of therapy. Two modes of contraception (male and female) are recommended to minimise the risk of the female becoming pregnant.

A No precautions are needed as thalidomide only represents a risk if it is taken by the female partner

As thalidomide can be transmitted in semen, adequate contraception for the male and female is essential.

C Only the female need use contraception

Due to the (albeit low) failure rate of female contraception, protection for the male and female is recommended.

D The male should refrain from starting a family for 3 years after using thalidomide

Only a 1-week thalidomide-free period is needed.

E Thalidomide is only teratogenic in the last trimester of pregnancy

The original thalidomide malformations were identified following use for first trimester morning sickness.

Question 9 of 218

A 30-year-old woman attends A&E with a 3-day history of fever, abdominal pain and dysuria. Her past medical history includes migraine, for which she takes sumatriptan prophylactically, and mild childhood asthma for which she has a salbutamol inhaler which she has not needed to use for years. She is looking forward to going on holiday to Tanzania in a week's time, and has just started primaquine for malarial prophylaxis. She is a non-smoker and drinks alcohol socially. She works for an advertising company.

Clinical examination is unremarkable, except for some suprapubic tenderness but no loin pain. Her urinalysis is positive for white blood cells and nitrites, and a pregnancy test negative. She is discharged on trimethoprim for a urinary tract infection, and given codeine for the abdominal pain.

She returns to A&E 2 days later with headache, nausea, dizziness and mild dyspnoea. On examination, she is slightly agitated, and appears cyanosed. Her temperature is 36.2 °C. Her pulse is 100 bpm, regular and blood pressure is 106/66 mmHg. Heart sounds are normal. Her respiratory rate is 30/min, but her chest sounds clear, with no crepitations or wheeze. Oxygen saturations are 85%. Her abdomen is soft and non-tender, with normal bowel sounds.

ECG shows sinus tachycardia. Chest X-ray appears clear.

Her ABG reveals a PO_2 of 12.6 kPa.

Her primaquine and trimethoprim are stopped.

What would be the next most appropriate step?

A	Give IV methylene blue
B	Give IV hydrocortisone
C	Stop sumatriptan

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D	CT head
E	Commence noninvasive positive pressure ventilation (NIPPV)

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Explanation

A Give IV methylene blue

The patient has methaemoglobinaemia, which may be due

Question 9 of 218

A Give IV methylene blue

The patient has methaemoglobinaemia, which may be due to trimethoprim and/or primaquine. Other causative agents include sulphonamides, lidocaine, dapsone, phenacetin, chloroquine, amyl nitrate, metoclopramide and aniline dyes.

Methaemoglobin inducers act by oxidising ferrous (Fe^{2+}) to ferric (Fe^{3+}) haemoglobin. This abnormal haemoglobin is incapable of carrying oxygen, inducing a functional anaemia. In addition, the shape of the oxygen-haemoglobin dissociation curve is altered, aggravating cellular hypoxia. Severity of symptoms usually correlates with measured methaemoglobin levels, and they are caused by decreased oxygen content and cellular hypoxia. They include headache, dizziness and nausea, progressing to dyspnoea, confusion, seizures and coma. Even at low levels, skin discolouration ('chocolate cyanosis'), especially of the nails, lips and ears, is striking. Diagnosis is suggested by a normal PO_2 in the presence of cyanosis and low O_2 saturations. The blood also appears chocolate brown when compared with normal blood. Methaemoglobin levels can be measured by the co-oximeter type of arterial blood gas analyser. Usually mild methaemoglobinaemia (<15–20%) resolves spontaneously and requires no intervention. Methylene blue is indicated in the symptomatic patient with methaemoglobin levels >20% or when even minimal compromise of oxygen-carrying capacity is potentially harmful (pre-existing anaemia, cardiac failure, ischaemic heart disease). Methylene blue is given at 1–2 mg/kg over several minutes. The causative agent should also be discontinued.

B Give IV hydrocortisone

The picture here is more consistent with hypoxia related to methaemoglobinaemia rather than acute asthma; IV hydrocortisone is therefore not of value here.

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The picture here is more consistent with hypoxia related to methaemoglobinaemia rather than acute asthma; IV hydrocortisone is therefore not of value here.

C Stop sumatriptan

Although this patient has headache, it is as a result of hypoxia rather than migraine, hence sumatriptan is not of value.

D CT head

Given the lack of focal neurology and normal blood pressure, an intracerebral lesion accounting for the headache is very unlikely.

E Commence noninvasive positive pressure ventilation (NIPPV)

Given the methaemoglobinaemia, improved delivery of oxygen via NIPPV is only likely to have a minor impact on symptoms of hypoxia.

A 70-year-old woman is seen in clinic, complaining of low mood and anhedonia. Her only past medical history is of atrial fibrillation, for which she takes digoxin and warfarin. Her rate is well controlled at 68 bpm. She feels she has become more withdrawn and would like to consider an antidepressant treatment.

Which is the most appropriate treatment which would minimises any effect on her warfarin treatment?

- A Fluoxetine
- B Venlafaxine
- C Amitriptyline
- D St John's Wort
- E Paroxetine

6403

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Your answer was incorrect

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B	Venlafaxine
C	Amitriptyline
D	St John's Wort
E	Paroxetine

Explanation

C	Amitriptyline

Amitriptyline is a tricyclic antidepressant which does not interact with warfarin. Whilst amitriptyline increases the risk of atrial fibrillation, this woman already has the condition and is rate controlled, so the extra risk associated

Explanation

C Amitriptyline

Amitriptyline is a tricyclic antidepressant which does not interact with warfarin. Whilst amitriptyline increases the risk of atrial fibrillation, this woman already has the condition and is rate controlled, so the extra risk associated with prescribing it for depression is low.

B Venlafaxine

Like SSRIs, SNRIs also inhibit platelet function, this is thought to be because of a decrease in intraplatelet 5-HT.

A Fluoxetine

SSRIs enhance the anticoagulant effect of warfarin by interfering with platelet function.

D St John's Wort

St John's Wort is derived from the herb *Hypericum perforatum*, and can reduce the anticoagulant effect of warfarin because of P450 enzyme induction.

E Paroxetine

Paroxetine, like fluoxetine, is an SSRI, which is recognised to interfere with platelet function.

A 43-year-old woman presents to the clinic feeling very depressed about weight gain that has occurred over the past two to three years. This is against a background of caring for three young school-age children.

She takes no medication of note, and has no significant past medical history.

On examination, her BP is 144/82 mmHg and her BMI is 31. A fasting glucose is measured at 6.2 mmol/l.

Which of the following is the most appropriate next step?

A	Metformin
B	Liraglutide
C	Gastric banding
D	Group-based dietary intervention
E	Prescribed exercise

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Explanation

D Group-based dietary intervention

Group weight loss programmes have been shown to be superior to individual effort with respect to dieting. As such, WeightWatchers, Slimming World and other such clubs are recommended to patients for initial weight

Explanation

D Group-based dietary intervention

Group weight loss programmes have been shown to be superior to individual effort with respect to dieting. As such, WeightWatchers, Slimming World and other such clubs are recommended to patients for initial weight management.

A Metformin

Metformin causes very modest weight loss and in this context (impaired fasting glucose), diet and exercise are superior to pharmacological intervention.

B Liraglutide

Liraglutide 3 mg is licensed for weight loss, but in this case with a BMI of 31, a period of attempted diet and exercise alone is advised.

C Gastric banding

Gastric banding is recommended for patients with morbid obesity and who are unable to lose weight by other means and have significant co-existing medical complications of obesity.

E Prescribed exercise

Although prescribed exercise will significantly impact on cardiovascular fitness, it has little impact on weight contro

A 21-year-old man is admitted unconscious. There is no history available.

On examination, his Glasgow Coma Scale (GCS) score is 3/15, blood pressure is 122/82 mmHg, pulse is 75 bpm and regular, respiratory rate is 14. There are stigmata of previous self-harm. He is intubated and sent to the ITU. A toxicity screen is sent and shows a paracetamol level of 330 µg/ml. *N*-acetylcysteine is commenced. On day 2, he is extubated. His progress is monitored over the next few days.

Which of the following is the most important determinant of liver transplant in paracetamol overdose?

A	Alanine aminotransferase (ALT)
B	pH
C	Prothrombin time (PT)
D	Bicarbonate
E	Alkaline phosphatase

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Explanation

B pH

The King's College Hospital criteria for liver transplantatio

B pH

The King's College Hospital criteria for liver transplantation in paracetamol-induced acute liver failure are what drive the answer to this question. They state that a patient should be listed for transplantation if arterial pH <7.3 or arterial lactate >3.0 mmol/l after adequate fluid resuscitation.

A Alanine aminotransferase (ALT)

Elevated transaminases are not considered a criterion for liver transplantation. Although elevated transaminases may demonstrate hepatocellular damage, it is impaired hepatic synthetic function which most affects outcomes.

C Prothrombin time (PT)

PT is one of three other criteria apart from pH which may drive transplantation; all three should be satisfied in a 24-hour period:

- Creatinine >300 µmol/l
- PT >100 (INR >6.5)
- Grade III/IV encephalopathy.

D Bicarbonate

Although low bicarbonate is a pointer to metabolic acidosis, it is decompensated metabolic acidosis with low pH which drives referral for transplantation.

E Alkaline phosphatase

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D Bicarbonate

Although low bicarbonate is a pointer to metabolic acidosis, it is decompensated metabolic acidosis with low pH which drives referral for transplantation.

E Alkaline phosphatase

Like ALT, alkaline phosphatase may be elevated in paracetamol-related liver failure, but it is not strongly associated with outcomes.

A 72-year-old woman is admitted to hospital with symptoms of weakness. She describes intermittent double vision and difficulty chewing and swallowing food. The patient has a background of angina, rheumatoid arthritis, atrial fibrillation and hypertension.

On examination, she has a general paucity of facial expression and she appears to be frowning her forehead intermittently. There is symmetrical upper limb weakness, while lower limb power is normal. She has normal sensatio and reflexes are normal. She has ptosis that appears to fluctuate. Eye movements appear to be normal.

What is the most likely medication in this patient that could cause these symptoms?

A	Nitrates
B	Penicillamine
C	Methotrexate
D	Hydralazine
E	Amiodarone

Question 13 of 218

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What is the most likely medication in this patient that could cause these symptoms?

Your answer was incorrect

A	Nitrates
B	Penicillamine
C	Methotrexate
D	Hydralazine
E	Amiodarone

Explanation

B Penicillamine

B **Penicillamine**

This patient has symptoms suggestive of myasthenia gravi (MG). Symptoms include weakness of facial muscles, ptosi (which can cause compensatory use of the frontalis muscle), extraocular muscle weakness, poor swallow and speech. Respiratory muscle involvement is a serious complication. The weakness worsens with exercise and reflexes are normal. Penicillamine can cause MG, and patients can have raised acetylcholine receptor antibodies. It is used for the treatment of rheumatoid arthritis and as a chelator for copper in Wilson's disease. Side-effects of penicillamine also include proteinuria and a lupus-like syndrome. Stopping penicillamine should reverse the myasthenic symptoms in the majority of cases.

D **Hydralazine**

Hydralazine is most strongly associated with drug-induced lupus (seen in up to 20% of patients who take the medication).

A **Nitrates**

Nitrates can result in headaches and syncope rather than MG.

C **Methotrexate**

Methotrexate results in hepatic and pulmonary fibrosis; liver function test and pulmonary function test monitoring during therapy is advised.

E **Amiodarone**

It is used for the treatment of rheumatoid arthritis and as a chelator for copper in Wilson's disease. Side-effects of penicillamine also include proteinuria and a lupus-like syndrome. Stopping penicillamine should reverse the myasthenic symptoms in the majority of cases.

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Nitrates can result in headaches and syncope rather than MG.

C Methotrexate

Methotrexate results in hepatic and pulmonary fibrosis; liver function test and pulmonary function test monitoring during therapy is advised.

E Amiodarone

Amiodarone is associated with pulmonary fibrosis and skin photosensitivity.

Question 14 of 218

A 38-year-old patient is admitted with an overdose of aspirin. She has a background of depression and self-harm. The patient admitted the overdose to her friend and states she took the overdose about 5 h ago. You understand from her friend that she took approximately 80 × 500 mg aspirin tablets. She is complaining of nausea and tinnitus.

On examination, her pulse is 115 bpm regular, respiratory rate 24/min, blood pressure 145/80 mmHg.

Investigations:

Blood gases on air

pH	7.28
$p_a(O_2)$	12.3 kPa
$p_a(CO_2)$	3.3 kPa

Hb	14.1 g/dl
WCC	5.5 × 10^9/l
PLT	235 × 10^9/l
Bicarbonate	15 mmol/l
Na^+	142 mmol/l
K^+	3.1 mmol/l
Urea	6.3 mmol/l
Creatinine	82 µmol/l
Salicylate	55 mg/dl

What is the next management step?

A IV bicarbonate

pH	7.28
$p_a(O_2)$	12.3 kPa
$p_a(CO_2)$	3.3 kPa

Hb	14.1 g/dl
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What is the next management step?

A IV bicarbonate

B IV ammonium chloride

C IV potassium replacement

D IV β-blockade

E IV magnesium

32790

Question 14 of 218

Investigations:

Blood gases on air

pH	7.28
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Creatinine	82 μmol/l
Salicylate	55 mg/dl

What is the next management step?

Your answer was incorrect

A IV bicarbonate

B IV ammonium chloride

C IV potassium replacement

C IV potassium replacement

Potassium replacement is the key next step in patients presenting with aspirin overdose who have significant hypokalaemia. As potassium falls near to and below 3.0 mmol/l, the risk of cardiac arrhythmia is significantly elevated.

A IV bicarbonate

IV bicarbonate is recommended when pH is particularly low (around 7.1 or lower). In this situation, with a very large overdose, progression to dialysis is likely (it is indicated when levels approach 700 mg/l and with deteriorating acidosis or conscious level).

B IV ammonium chloride

Ammonium chloride can be considered for urinary alkalinisation, but at this stage potassium replacement is most important.

D IV β-blockade

As acidosis worsens this patient is likely to become increasingly haemodynamically unstable. Beta-blockade is therefore not indicated for treatment of tachycardia.

E IV magnesium

Although the patient may be hypomagnesaemic, potassium replacement should be commenced first.

A 39-year-old woman who is pregnant with her first child comes to the clinic for review. She had chronic hypertension prior to becoming pregnant and was treated with ramipril, but this was changed to methyldopa. She is now 20 weeks' pregnant and the dose was recently increased to 1 g BD. Unfortunately, she has an excessively dry mouth and feels tired all the time and wants the medication changed to something else.

On examination, her blood pressure (BP) is 145/90 mmHg compared to 148/88 mmHg at her booking visit.

Investigations:

Haemoglobin (Hb)	10.8 g/dl
White cell count (WCC)	5.6 × 10^9/l
Platelets (PLT)	201 × 10^9/l
Sodium (Na⁺)	140 mmol/l
Potassium (K⁺)	4.5 mmol/l
Creatinine (Cr)	90 µmol/l

Which of the following would be the most appropriate medication from the list below to switch her to?

A	Ramipril
B	Bendroflumethiazide
C	Valsartan
D	Atenolol
E	Labetalol

Explanation

E Labetalol

Labetalol is not associated with intra-uterine growth retardation (as is seen with some other beta blockers), and hence it is now the recommended NICE first-line intervention for control of hypertension in pregnancy.

A Ramipril

ACE inhibitors are contraindicated in pregnancy and are associated with a range of fetal abnormalities including renal and skeletal malformations.

B Bendroflumethiazide

This reduces the volume expansion associated with normal pregnancy and is also associated with renal tract abnormalities.

C Valsartan

Like ACE inhibitors, ARBs are associated with renal tract and skeletal abnormalities in the fetus when prescribed in pregnancy.

D Atenolol

This is not associated with congenital malformations, but is associated with intra-uterine growth retardation, driving the use of labetalol in preference to it.

A 25-year-old woman was brought to the Emergency Department with a history of episodic abnormal posturing of her torso and neck for the past few hours. She had a long history of behavioural problems and was known to have had brawls with her neighbours. Her mother had recently taken her to the psychiatrist and she has been initiated on antipsychotic medication.

On examination, she was afebrile. Her neck was in forced extension, there was arching of her back and her arms were internally rotated. There was extension of the elbows and wrists.

What is the correct description of her clinical picture?

A	Decerebrate rigidity
B	Anterocollis
C	Opisthotonus
D	Chorea
E	Decorticate posturing

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B	Anterocollis
C	Opisthotonus
D	Chorea
E	Decorticate posturing

Explanation

C Opisthotonus

This is the typical picture of an acute generalised dystonic

Question 16 of 218

C Opisthotonus

This is the typical picture of an acute generalised dystonic reaction to neuroleptic drugs (e.g. phenothiazines, butyrophenones, metoclopramide and even atypical antipsychotic agents such as olanzapine). The description given here (retrocollis, arching of the back, internal rotation of the arms and extension of the elbows) suggests an extreme dystonic reaction in the form of opisthotonus. Opisthotonus also occurs in other neurological situations, including (classically) tetanus or hypoxic-ischaemic brain injury. It is also seen in strychnine poisoning.

A Decerebrate rigidity

Decerebrate rigidity results from a midbrain lesion and is manifest by an exaggerated extensor posture of all four limbs.

B Anterocollis

Anterocollis is forward flexion of the head and neck, rather than the extensor posture seen here.

D Chorea

Chorea is abnormal involuntary movement characterised by brief, abrupt, irregular, unpredictable, non-stereotyped movements.

E Decorticate posturing

Decorticate posturing is characterised by arm flexion and inward turning, extended lower limbs.

A 68-year-old man is admitted to the Emergency Department with an acute myocardial infarction. He is hypotensive and sweating on admission, with a BP of 100/60 mmHg and pulse of 105/min. There is anterior ST elevation. Past history of note is hypertension, for which he receives ramipril 5 mg, indapamide 2.5 mg and amlodipine 5 mg.

Within a few minutes of admission, he suffers a cardiac arrest. In total he receives CPR for 6 min before he regains his output. His BP is 95/60 mmHg, with pulse 100/min and regular. He later goes to the catheter lab where he is stented. Creatinine on admission is 135 micromol/l.

What is the optimal initial intervention to prevent acute tubular necrosis?

A Start IV furosemide

B Start renal dose dopamine

C Start dobutamine

D Increase ramipril

E Fluid replacement with CVP monitoring

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A	Start IV furosemide
B	Start renal dose dopamine
C	Start dobutamine
D	Increase ramipril
E	Fluid replacement with CVP monitoring

Explanation

E Fluid replacement with CVP monitoring

This patient is at significant risk of ischaemic acute tubular necrosis due to a prolonged period of renal hypoperfusion associated with his anterior MI and subsequent cardiac

E Fluid replacement with CVP monitoring

This patient is at significant risk of ischaemic acute tubular necrosis due to a prolonged period of renal hypoperfusion associated with his anterior MI and subsequent cardiac arrest. Maintaining CVP in the normal range with tailored fluid replacement is the best way to minimise deterioration in renal function.

A Start IV furosemide

Although loop diuretics are used in this situation, there is little evidence that they have a positive impact on renal outcomes.

B Start renal dose dopamine

Although renal dose dopamine was historically used to prevent ATN, there is no evidence that it is any more effective than placebo.

C Start dobutamine

Dobutamine is used as a cardiac inotrope, and may increase the risk of arrhythmia and myocardial ischaemia in this situation.

D Increase ramipril

Ramipril increases the risk of renal hypoperfusion and has a potentially negative impact on the risk of ATN.

36523

An 18-year-old woman is admitted to the Emergency Department. She has begun vomiting and feels that she cannot keep any food down at all. She admits to taking an overdose of 48 × 500 mg paracetamol tablets some three days earlier because of concerns about her A-level exams. There is no past medical history of note.

On examination, her blood pressure (BP) is 100/60 mmHg, with pulse 85/min and regular. She is markedly tender in the right upper quadrant of her abdomen.

Investigations:

Haemoglobin (Hb)	12.2 g/dl
White cell count (WCC)	11.1 × 10^9/l
Platelet (PLT)	203 × 10^9/l
Sodium (Na^+)	140 mmol/l
Potassium (K^+)	5.3 mmol/l
Bicarbonate	18 mmol/l
Creatinine (Cr)	141 umol/l
International normalised ratio (INR)	4.2
Alanine transaminase (ALT)	3430 U/l

Which of the above is the most important indication for referral to a specialist unit?

A ALT 3430 U/l

B Bicarbonate 18 mmol/l

C Creatinine 141 μmol/l

D INR 4.2

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B Bicarbonate 18 mmol/l

C Creatinine 141 µmol/l/l

D INR 4.2

E K^+ 5.3 mmol/l

D INR 4.2

Elevated INR is a strong indicator of impaired hepatic synthetic function, and INR >2.0 at or before 48 h or >3.5 at or before 72 h (peak elevation occurs around 72-96 h), is an indication for referral to a specialist liver unit. INR >6.5 is an indication for referral for liver transplant.

A ALT 3430 U/l

Although ALT elevation is indicative of hepatocellular necrosis, it is impaired hepatic synthetic function that is most predictive of poor outcome in paracetamol overdose.

B Bicarbonate 18 mmol/l

Bicarbonate isn't called out as an indicator for specialist referral, although arterial pH <7.3 or lactate >3.0 mmol/l after adequate fluid resuscitation are reasons to refer.

C Creatinine 141 μmol/l/l

Creatinine >200 is considered a criterion for specialist referral, with creatinine >300 one of the criteria for referral for liver transplant.

E K^+ 5.3 mmol/l

This is towards the upper end of the normal range, but is likely to correct with adequate fluid resuscitation.

A 26-year old woman who is 36 weeks pregnant presents with a history of palpitations, sweating and diarrhoea. She has no past medical history of note and her pregnancy has otherwise been unremarkable.

On examination, she has a resting tremor. Her pulse is 100 bpm, regular. Blood pressure is 118/68 mmHg. Heart sounds are normal. Her chest is clear and abdominal examination reveals a gravid uterus correct for her dates.

Blood results are as follows:

Hb	12.6 g/dl
WCC	6.2 × 10^9/l
PLT	214 × 10^9/l
MCV	86 fl
Na^+	142 mmol/l
K^+	4.1 mmol/l
Creatinine	62 μmol/l
Urea	4.2 mmol/l
Bilirubin	6 μmol/l
Albumin	38 g/l
Alkaline phosphatase	68 U/l
ALT	26 U/l
TSH	0.01 mU/l (0.4–5 mU/l)
Free T4	36.4 pmol/l

She plans to breastfeed her baby after delivery.

What is the most appropriate therapy?

A Lugol's iodine

MCV	[illegible]
Na⁺	142 mmol/l
K⁺	4.1 mmol/l
Creatinine	62 µmol/l
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B Carbimazole

C Propylthiouracil

D Radioiodine therapy after delivery of the baby

E Blocking dose of carbimazole with supplemental thyroxine

Question 19 of 218

Na⁺	142 mmol/l
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E Blocking dose of carbimazole with supplemental thyroxine

Explanation

B Carbimazole

The choice here is between carbimazole and propylthiouracil at a dose to control thyroid hormone levels without blocking them completely. What drives the choice between propylthiouracil and carbimazole in this situation is the adverse event profile. Cases of fatal hepatotoxicity have been described with propylthiouracil, and for this reason carbimazole is always recommended in late pregnancy. Neither is recommended in breastfeeding, although if she insists on a plan to breastfeed, switching to propylthiouracil post-partum is potentially the safer option.

A Lugol's iodine

Lugol's iodine is occasionally prescribed for patients undergoing thyroid surgery, but causes goitre in infants. It is primarily used for short-term control of thyrotoxicosis.

C Propylthiouracil

Propylthiouracil is not recommended here because of the risk of maternal hepatotoxicity.

D Radioiodine therapy after delivery of the baby

Radioiodine therapy is contraindicated in pregnancy and breastfeeding, and it is recommended that patients avoid becoming pregnant for six months after therapy. It also presents logistical difficulties in that the woman would not be able to remain in close proximity to her baby for some time after dosing.

E Blocking dose of carbimazole with supplemental thyroxine

Carbimazole crosses the placenta but thyroxine does not,

propylthiouracil post-partum is potentially the safer option.

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E	Blocking dose of carbimazole with supplemental thyroxine

Carbimazole crosses the placenta but thyroxine does not, so the 'block and replace' approach could render the neonate profoundly hypothyroid.

Question 20 of 218

An 18-year-old male is admitted with a history of being confused since a couple of hours before. His mother confessed that her son was trying to lose weight and had joined a local gym. He was consuming a powder which she recalled as being called 'Cherry Meth'. This is mixed with water and he had told her that it tasted like seaweed.

On examination he was agitated, but drowsy. His pulse was 45/min and blood pressure was 90/70 mmHg. The remainder of the physical examination was unremarkable.

However, he gradually lapsed into coma during the period of observation and had Cheyne–Stokes breathing. Respiration became progressively depressed and he was intubated and ventilated. Supportive treatment was started. Surprisingly, he regained consciousness spontaneously and pulled out the endotracheal tube within 3 h.

Investigations:

Glucose	10.5 mmol/l
Na^+	150 mmol/l
K^+	6.3 mmol/l
pH	7.3
Bicarbonate	23 mmol/l
Base deficit	2
Urea	6.0 mmol/l
Creatinine	120 mmol/l
ALT	34 U/l
Ammonia	25 µmol/l

What is the most likely diagnosis?

A Urea cycle disorder

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What is the most likely diagnosis?

A	Urea cycle disorder
B	Metabolic encephalopathy
C	Gamma-hydroxybutyrate overdose
D	LSD overdose
E	Dextropropoxyphene overdose

C Gamma-hydroxybutyrate overdose

Gamma-hydroxybutric acid (GHB) is sold illegally for bodybuilding, weight loss and as a replacement for L-tryptophan. It is in a powder form and dissolved in water. Its taste is similar to that of seaweed. It is popularly known as Liquid X, Cherry Meth, Easy Lay, Scoop or GBH. Dependent on the dose, patients develop gastrointestinal effects, euphoria, drowsiness, Cheyne–Stokes respiration, coma, decreased cardiac output and severe respiratory depression. Fatalities have been reported, usually in malicious overdose when taken with other substances. Patients recover quickly, often within 1–2 h, and they may have rapid reversal of coma and may remove the endotracheal tube themselves. Metabolic acidosis, hyperglycaemia, hyperkalaemia and hypernatraemia can occur. Supportive care includes activated charcoal for up to 1 h after ingestion, so it is a little outside the time window here. For a couple of hours, monitoring of blood pressure, heart rate, respiratory rate and oxygenation should be done. Naloxone has shown benefit in animals. Diazepam is the drug of choice for treating convulsions.

A Urea cycle disorder

Urea cycle disorders are inborn errors of nitrogen metabolism that lead to accumulation of ammonia.

B Metabolic encephalopathy

Metabolic encephalopathy is a differential, but the history of Cherry Meth consumption drives us more towards drug induced metabolic disorder as the most likely answer.

D LSD overdose

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B Metabolic encephalopathy

Metabolic encephalopathy is a differential, but the history of Cherry Meth consumption drives us more towards drug induced metabolic disorder as the most likely answer.

D LSD overdose

LSD overdose is associated with hallucinations and agitation, rather than the obtunded picture seen here.

E Dextropropoxyphene overdose

Codeine overdose may present with decreased consciousness, but of course it isn't marketed as a weight loss agent.

A 60-year-old woman with a history of chronic atrial fibrillation has collapsed at home and has been admitted through Accident & Emergency. She is taking digoxin. She has no history of ischaemic heart disease.

Other medication of note includes ketoconazole for a chronic fungal infection, and an antibiotic started by the duty general practitioner (GP) for a lower respiratory tract infection.

On examination, her blood pressure is 132/82 mmHg, pulse is 63 bpm and regular. Her heart sounds are normal and there are coarse breath sounds at the right base on auscultation.

Investigations:

ECG: sinus rhythm, a heart rate of 65 bpm, axis 30 °, PR interval 120 ms, QRS interval of 107 ms and QTc of 510 ms.

Which antibiotic is most likely to have been started in this patient?

A	Amoxicillin
B	Doxycycline
C	Cefalexin
D	Clarithromycin
E	Co-amoxiclav

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D	Clarithromycin
E	Co-amoxiclav

Explanation

Explanation

D	Clarithromycin

This woman has an abnormal ECG and presented with a collapse. Her QTc is prolonged. Both ketoconazole and clarithromycin are known to prolong the QT interval, and clarithromycin is therefore the correct answer here. The antibiotic should be stopped, as should the ketoconazole if possible, and the patient monitored for episodes of torsades. In the event that there is hypokalaemia or hypomagnesaemia, then these electrolyte abnormalities should be corrected.

A	Amoxicillin

Penicillin-based antibiotics are not associated with QT prolongation.

B	Doxycycline

Tetracycline-based antibiotics are not associated with QT prolongation; a main concern of their use is that they can cause symptomatic gastro-oesophageal reflux.

C	Cefalexin

Cephalosporins, like penicillins, do not cause prolonged QT.

E	Co-amoxiclav

This is amoxicillin plus clavulanic acid. Clavulanic does not have significant effects on the cardiac action potential.

2595

Rana Alnasser's screen

Question 22 of 218

A 28-year-old man presents with cyanosis, headache and confusion. You understand he has been recently started on primaquine as malaria prophylaxis prior to a trip Africa on holiday.

On examination, he has a respiratory rate of 16/min and is relatively comfortable breathing air. There is clear cyanosis; in particular, his tongue is blue.

Investigations:

Hb	13.0 g/dl
MCV	86 fl
WCC	4.9 × 10^9/l
PLT	195 × 10^9/l
Na^+	141 mmol/l
K^+	4.9 mmol/l
Creatinine	130 µmol/l
Sat	94%
MetHb	10%

Which of the following is the most appropriate therapy?

A Ascorbic acid

B Exchange transfusion

C N-acetylcysteine

D Methylene blue

E Chlorpheniramine

Rana Alnasser's screen

D Methylene blue

Primaquine and its metabolites can act as oxidising agents, increasing the risk of methaemoglobinaemia where iron in haemoglobin is in the Fe^{3+} state, meaning that the haemoglobin holds strongly onto oxygen. This leads to tissue hypoxia. Methylene blue IV is the first-line therapy for methaemoglobinaemia. It must be administered with care, however, as at doses >7 mg/kg it becomes an oxidant itself. Other drug-induced causes of methaemoglobinaemia include nitrites, aniline dyes, nitroprussides, local anaesthetics and dapsone.

A Ascorbic acid

Ascorbic acid is used as a second-line therapy, usually when methaemoglobin levels approach 30% or greater.

B Exchange transfusion

Exchange transfusion can be considered when patients fail to respond to 1st- and 2nd-line interventions for methaemoglobinaemia and still suffer significant tissue hypoxia.

C N-acetylcysteine

N-acetylcysteine is more conventionally used as an antidote to paracetamol toxicity, although case series suggest it may be of value in resistant methaemoglobinaemia.

E Chlorpheniramine

Chlorpheniramine is an antihistamine and is not of value in treating methaemoglobinaemia.

A 68-year-old woman presents to the Emergency Department with vomiting, diarrhoea and confusion. Her medical history reveals mild renal impairment, with a creatinine level of 189 µmol/l and a potassium level of 6.2 mmol/l. Other history of note is chronic atrial fibrillation, which is rate-controlled with digoxin.

Her general practitioner (GP) had recently increased the dose of digoxin and commenced diuretics for heart failure. Her digoxin level is 18 ng/ml. Soon after admission, she becomes unwell, with a blood pressure of 95/50 mmHg.

Her electrocardiogram (ECG) is shown below.

Image created by Karthik Sheka, M.D. [CC BY-SA 2.5 (https://creativecommons.org/licenses/by-sa/2.5)], via Wikimedia Commons

What is the most appropriate immediate intervention in this case?

A	Wait for intravenous (IV) Digibind® to become available
B	Give phenytoin 250 mg IV over 5 minutes

Question 23 of 218

B Give phenytoin 250 mg IV over 5 minutes

The ECG demonstrates monomorphic ventricular tachycardia (VT). Phenytoin prolongs effective refractory period and depresses spontaneous depolarization in ventricular tissue. It can therefore be used to terminate VT in affected patients with digoxin overdose.

C Give lidocaine 100 mg IV loading

Lidocaine is the next alternative for VT in the context of digoxin overdose if phenytoin is ineffective.

A Wait for intravenous (IV) Digibind® to become available

Digibind® consists of digoxin-binding antibody fragments, and the dose used depends on the digoxin level and the patient's weight. Prognostic indicators of severe digoxin toxicity include digoxin levels of > 15 ng/ml and serum potassium level of > 5 mmol/l. Susceptibility to toxicity is further increased by kidney disease, hypothyroidism or hypomagnesaemia. Were Digibind® available, then it should be given concurrently with phenytoin. Waiting risks this patient suffering a cardiac arrest.

D Give insulin and dextrose IV

Although correction of hyperkalaemia may be required, it is the VT which requires immediate intervention.

E Arrange for direct current (DC) cardioversion

This woman is maintaining a systolic blood pressure of 95 mmHg, and DC cardioversion in the context of digoxi overdose is usually unsuccessful. Attempts at chemical

A 18-year-old man attends clinic for investigation of epilepsy. His schoolwork has been declining. Friends and relatives have noticed he will have tendencies to stop in mid-sentence and then start again. The attacks come on suddenly with no warning and last less than 30 seconds. There is no limb jerking or post-ictal confusion. He has had an electroencephalogram recording that has shown 3 Hz spike and wave complexes during the attack.

Which of the following antiepileptic medications would you consider?

A	Carbamazepine
B	Sodium valproate
C	Vigabatrin
D	Gabapentin
E	Phenytoin

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Which of the following antiepileptic medications would you consider?

Your answer was correct

- A Carbamazepine
- B Sodium valproate
- C Vigabatrin
- D Gabapentin
- E Phenytoin

Explanation

B Sodium valproate

The patient is having absence seizures, probably in the context of idiopathic generalised epilepsy, and the preferred first-line agent is sodium valproate. Use of sodium valproate has reduced in recent years, particularly in the female population, largely due to a PCOS-like

The patient is having absence seizures, probably in the context of idiopathic generalised epilepsy, and the preferred first-line agent is sodium valproate. Use of sodium valproate has reduced in recent years, particularly in the female population, largely due to a PCOS-like syndrome which can result in weight gain, skin changes including acne, and hair loss. Valproate is also associated with a higher risk of major fetal malformation than other antiepileptic drugs. This has prompted increased use of lamotrigine, particularly in females, which is not associated with a PCOS-like syndrome, and is not a P450 enzyme inhibitor. Another alternative to sodium valproate is ethosuximide, although it can cause abdominal pain, agrunolocytosis, drowsiness and the Stevens-Johnson syndrome, and is much less commonly used.

A Carbamazepine

Carbamazepine can actually worsen seizures in primary generalised epilepsy and should therefore be avoided here.

C Vigabatrin

Like carbamazepine, vigabatrin can worsen seizure control in primary generalised epilepsy and is best avoided here.

D Gabapentin

Although gabapentin is effective, it is associated with significant drowsiness and apraxia at high doses. As such it is now less utilised for the treatment of primary generalised epilepsy.

E Phenytoin

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E Phenytoin

Phenytoin has an adverse side-effect profile versus other anti-epileptic choices including skin rashes, gingival hypertrophy and osteoporosis, meaning that it is not a first choice here.

A 25-year-old nursery teacher attends the Emergency Department having deliberately ingested a number of tablets 14 h earlier. She believes that she has probably taken around 35 co-dydramol tablets that were prescribed for her father. She takes a herbal remedy for low mood which she self-prescribes.

On examination, she is alert, with a Glasgow Coma Scale (GCS) score of 15, pupils are mid-sized and reactive, she has a heart rate of 80 bpm and blood pressure of 115/75 mmHg.

The next best intervention would be:

A 50 g of activated charcoal orally

B Gastric lavage

C *N*-acetyl cysteine intravenously

D Methionine orally

E Check paracetamol levels and act if they are raised

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The next best intervention would be:

Your answer was incorrect

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B Gastric lavage

C *N*-acetyl cysteine intravenously

D Methionine orally

E Check paracetamol levels and act if they are raised

Explanation

C *N*-acetyl cysteine intravenously

Paracetamol ingestion makes up 40% of admissions for poisoning in the UK, and leads to between 200 and 300 deaths annually. Toxicity is possible in those who have ingested 150 mg/kg bodyweight or > 12 g in total (for a patient of 75 kg). St John's Wort (*Hypericum perforatum*)

C N-acetyl cysteine intravenously

Paracetamol ingestion makes up 40% of admissions for poisoning in the UK, and leads to between 200 and 300 deaths annually. Toxicity is possible in those who have ingested 150 mg/kg bodyweight or > 12 g in total (for a patient of 75 kg). St John's Wort (*Hypericum perforatum*) is commonly taken for mild-to-moderate depression, and is an inducer of hepatic enzymes, which would place the user at high risk of toxicity. From what she has told you she has ingested a potentially lethal dose of paracetamol, and *N*-acetylcysteine should therefore be started without waiting, as it has definitive benefit if given within the first 15 h after overdose.

E Check paracetamol levels and act if they are raised

This risks a potentially significant delay, during which hepatotoxicity will worsen significantly.

A 50 g of activated charcoal orally

Activated charcoal is generally recommended within 1 h of a potentially toxic dose; at this stage it is far too late to have a significant impact.

B Gastric lavage

Gastric lavage has a very limited role in the treatment of poisoning, and would not impact on outcomes here. It is no longer used at all in the management of paracetamol overdose.

D Methionine orally

Methionine is used for patients who are unable to tolerate

A 54-year-old man has suffered an episode of collapse while playing squash, and when paramedics arrived at the scene he was found to be in cardiorespiratory arrest, with underlying ventricular fibrillation. An output was restored with one biphasic DC shock of 150 J, and he quickly regained consciousness, albeit with mild confusion.

He has a history of diabetes mellitus and was recently commenced on some new medication by his general practitioner (GP) because of leg pains, not sleeping and feeling generally down. He is not sure what this is, nor what it is for. An electrocardiogram (ECG) shows prolongation of the QT interval.

Which drug is the most likely cause of his QT prolongation?

A Diclofenac

B Amitryptyline

C Co-amoxiclav

D Paroxetine

E Sodium valproate

Question 26 of 218

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C	Co-amoxiclav
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Explanation

B Amitryptyline

A prolonged QT interval (measured from the beginning of the QRS complex to the end of the T wave) increases the risk of ventricular dysrhythmias occurring, particularly

B Amitryptyline

A prolonged QT interval (measured from the beginning of the QRS complex to the end of the T wave) increases the risk of ventricular dysrhythmias occurring, particularly torsades de pointes, which may then deteriorate to ventricular fibrillation. The normal QT interval is approximately 0.38–0.46 s when corrected for ventricular rate, but may be prolonged due to an underlying genetic abnormality: Romano-Ward syndrome and Jervell-Lange-Nielsen syndrome are examples. Acquired causes include electrolyte abnormalities such as hypocalcaemia and hypomagnesaemia, and drugs. These include classes Ia, Ic and III anti-arrhythmic agents, tricyclic antidepressants, erythromycin, haloperidol and azole antifungals.

A Diclofenac

Diclofenac does not lead to QT prolongation, but can promote salt and water retention, leading to worsening of blood pressure control and fluid retention, and also to gastric irritation.

C Co-amoxiclav

Neither clavulanic acid nor penicillins impact on the QT interval, and we're given no indication of recent infection.

D Paroxetine

Paroxetine is associated with episodes of both sinus tachycardia and bradycardia, but isn't associated with QT prolongation.

E Sodium valproate

The main concerns with respect to sodium valproate use

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D Paroxetine

Paroxetine is associated with episodes of both sinus tachycardia and bradycardia, but isn't associated with QT prolongation.

E Sodium valproate

The main concerns with respect to sodium valproate use are liver dysfunction, pancreatitis and teratogenicity in women of child-bearing potential.

Question 27 of 218

A 55-year-old man with a history of chronic alcohol abuse is admitted to hospital having had a witnessed generalised tonic-clonic seizure in the street following which a bystander called an ambulance. He had a further seizure while in the ambulance on the way to hospital, terminated by PR diazepam. A third, brief seizure occurs on arrival at the A&E department.

He has no other significant past medical history of note, and is not on any regular medications. He denies recreational drug use, and has not drunk any alcohol in the past 24 hours.

Baseline observations are as follows:

Temperature	36.5 °C
Pulse	88 bpm
Blood Pressure	132/68 mmHg
O_2 sats	97% air
Blood glucose	5.4 mmol/l

A computed tomography (CT) brain is performed which is normal. On return from the scanner, he suffers a further seizure which has lasted for around 2 minutes.

What is the most appropriate short-term intervention?

A Oral carbamazepine

B Give intravenous (iv) lorazepam followed by long term sodium valproate

C Give iv lorazepam

D No intervention required

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What is the most appropriate short-term intervention?

A	Oral carbamazepine
B	Give intravenous (iv) lorazepam followed by long term sodium valproate
C	Give iv lorazepam
D	No intervention required
E	Start oral sodium valproate

C Give iv lorazepam

Alcohol withdrawal seizures usually occur after an 8- to 24-hour alcohol-free period. If there is no known history of epilepsy, and no underlying structural brain lesion is identified, long-term antiepileptic treatment is not required. In the acute setting, iv lorazepam has been shown to reduce the risk of recurrent seizures. Patients are then managed according to a CIWA alcohol withdrawal protocol.

B Give intravenous (iv) lorazepam followed by long term sodium valproate

There is no indication for long-term sodium valproate unless generalised seizures are seen post alcohol withdrawal.

A Oral carbamazepine

Oral carbamazepine is mainly used in the management of partial seizures, which may of course result from alcohol abuse, although here short-term prevention of further withdrawal seizures with lorazepam is most important.

D No intervention required

Not treating with benzodiazepines in this situation runs the risk of further withdrawal seizures with associated mortality and morbidity.

E Start oral sodium valproate

In this situation, iv benzodiazepines are the intervention of choice to prevent further withdrawal seizures. Anti-epileptics are not required unless seizures occur over the longer term

You review a man who is currently receiving 6-mercaptopurine (6-MP) as part of his treatment regimen for inflammatory bowel disease.

Which of the following drugs may cause a fatal drug interaction when used in conjunction with 6-MP?

A Allopurinol

B Erythromycin

C Theophylline

D Propranolol

E Ciprofloxacin

E485

A Allopurinol

6-mercaptopurine (6-MP) is a purine antagonist that interferes with the process of DNA synthesis and the drug is usually used as part of chemotherapy in the treatment of acute leukaemias and as a treatment for inflammatory bowel disease. Allopurinol is a xanthine oxidase inhibitor, and xanthine oxidase is responsible for the metabolism of 6-MP. Therefore, co-administration of allopurinol and 6-MP may result in a build up to toxic levels of 6-MP. Azathioprine is metabolised to 6-MP and therefore should also be avoided in patients receiving allopurinol therapy.

B Erythromycin

The main concern with erythromycin prescription is the fact that it is a potent CYP 450 3A4 inhibitor, which drives accumulation of co-prescribed drugs such as statins which are metabolised via this route.

C Theophylline

Theophylline undergoes extensive hepatic metabolism, and it is theophylline which is a cause of toxicity when its metabolism is blocked by P450 inhibitors.

D Propranolol

The main concern with respect to propranolol use is bronchospasm in susceptible patients.

E Ciprofloxacin

Ciprofloxacin is a moderate inhibitor of CYP 1A2, which can promote accumulation of agents such as theophylline.

Question 29 of 218

A 50-year-old Asian man had recently been diagnosed with pulmonary tuberculosis and was started on quadruple anti-TB therapy. He seemed withdrawn, however, and had insomnia. He had attempted suicide on several occasions in the presence of friends by trying to stab himself, though had been rescued every time. He had been referred urgently to the psychiatrist. However, he was brought to the Emergency Department in a comatose state with ongoing generalised convulsions and vomiting.

On examination, temperature was 38 °C, pulse 120/min and blood pressure 90/50 mmHg.

Investigations:

Na^+	140 mmol/l
K^+	3.3 mmol/l
Chloride	95 mmol/l
Bicarbonate	20 mmol/l
pH	7.2
Urea	18 mmol/l
Creatinine	440 µmol/l

Given the overall clinical picture, what is the most likely cause of his acute symptoms and signs?

A Tuberculous meningitis

B Fungal meningitis

C Overdose of isoniazid

D Overdose of ethambutol

E Overdose of pyrizinamide

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C	Overdose of isoniazid
D	Overdose of ethambutol
E	Overdose of pyrizinamide

C Overdose of isoniazid

This patient has taken an overdose of isoniazid, possibly in combination with rifampicin. He has presented with refractory convulsions and metabolic acidosis with an increased anion gap and coma. This is calculated as ($[Na^+] + [K^+]) - ([Cl^-] + [HCO_3^-]$). Its normal value is 10–14 mmol/l, but in this patient it is 28.3 mmol/l. The kidney disease is probably due to rhabdomyolysis. Isoniazid is recognised as inhibiting conversion of pyridoxine to both its active form, and to lactate dehydrogenase, which is thought to contribute to a presentation with metabolic acidosis.

A Tuberculous meningitis

Tuberculous meningitis is associated with a subacute course, and the rapid deterioration in association with presentation to the psychiatrist is more suggestive of overdose.

B Fungal meningitis

Fungal meningitis is more likely to be seen in patients with significant immunosuppression, and we are given no history of immunosuppressive disease here.

D Overdose of ethambutol

Ethambutol overdose is associated with headache, confusion, pyrexia and GI upset.

E Overdose of pyrizinamide

Pyrazinamide overdose is associated with abnormal liver function testing and hyperuricaemia.

During a clinical trial of a new proton pump inhibitor (PPI) drug, concerns were raised as to a possible link between the drug and the incidence of oesophageal carcinoma.

In a trial population of 12,300 patients with gastro-oesophageal reflux disease (GORD), 41 patients developed oesophageal carcinoma compared with 31 patients in the control arm of the study. Nine patients in a normal (matched for age and sex) population of the same size as the treatment group without GORD developed oesophageal cancer over the same time period.

Which of the following statements best describes the relevance of this concerning the safety of the drug?

A	The trial should be stopped immediately
B	A further 10,000 patients should be entered into the trial and the results re-assessed afterwards
C	The drug should be withdrawn from the market
D	The discrepancy between trial and the age and sex matched group is likely to be related to the indication for treatment in the trial population, (underlying GORD, rather than the drug)
E	The small number of oesophageal carcinomas makes a chance association between GORD and cancer likely

6507

Question 30 of 218

D	The discrepancy between trial and the age and sex matched group is likely to be related to the indication for treatment in the trial population, (underlying GORD, rather than the drug)

The discrepancy between trial and matched control group is likely to be related to the indication for treatment in the trial population. The normal group does not have any evidence of gastro-oesophageal reflux and is merely a randomly selected group from the population, matched for age and sex criteria. GORD can lead to the development of Barrett's oesophagus, which is associated with a markedly increased risk of oesophageal carcinoma. Given the size of the trial it is likely that neither treatment significantly affected the risk of developing cancer in high risk patients, and the difference between the two arms of the study is play of chance. Barrett's is characterised by the development of areas of columnar metaplasia within the lower oesophagus and this is associated with transformation to adenocarcinoma. Patients with symptoms of reflux are said to be 8 times more likely to develop oesophageal carcinoma than the general population.

A	The trial should be stopped immediately

The difference of 10 between new treatment and control arms of the study is highly unlikely to be statistically significant and further evaluation is essential.

B	A further 10,000 patients should be entered into the trial and the results re-assessed afterwards

Oesophageal cancer is thankfully rare, and cases take time to acquire, adding a further 10,000 patients is likely to be a very inefficient way to study this new agent.

C	The drug should be withdrawn from the market

A 37-year-old woman is scheduled to receive a 3-unit blood transfusion. The nurses check that the first unit is appropriately matched and begin the transfusion. One hour later, the transfusion is stopped as her temperature spikes at 37.9 °C and she is suffering from back pain.

Bloods taken after the transfusion is stopped reveal no evidence of haemolysis.

Which of the following is the most appropriate next option?

A	Give chlorpheniramine
B	Give paracetamol
C	Recheck the label and then restart the transfusion
D	Give hydrocortisone
E	Give S/C adrenaline

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Your answer was incorrect

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Explanation

B Give paracetamol

Non-haemolytic transfusion reactions characterised by pyrexia are usually due to the presence of cytokines within the transfused unit of blood. Despite this type of reaction following a [illegible] course, it is still important to differentiate them from haemolytic transfusion reactions, as where [illegible] clear [illegible] the [illegible] iden[illegible]

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D	Give hydrocortisone
E	Give S/C adrenaline

Explanation

B Give paracetamol

Non-haemolytic transfusion reactions characterised by pyrexia are usually due to the presence of cytokines within the transfused unit of blood. Despite this type of reaction following a benign course, it is still important to differentiate them from haemolytic transfusion reactions, as here, where we are clearly told there is no evidence of haemolysis. Management of choice is to stop the transfusion and treat the patient with paracetamol.

A Give chlorpheniramine

Antihistamines are only required when there is evidence of an allergic reaction to the unit of blood.

C Recheck the label and then restart the transfusion

differentiate them from haemolytic transfusion reactions, as here, where we are clearly told there is no evidence of haemolysis. Management of choice is to stop the transfusion and treat the patient with paracetamol.

A Give chlorpheniramine

Antihistamines are only required when there is evidence of an allergic reaction to the unit of blood.

C Recheck the label and then restart the transfusion

The pyrexia is indicative of cytokine release, suggesting that intervention with paracetamol is required.

D Give hydrocortisone

Hydrocortisone is most useful for serious transfusion reactions related to red cell antigen incompatibility and anaphylaxis.

E Give S/C adrenaline

Similar to hydrocortisone, adrenaline, usually given IM, is considered for an acute anaphylactic transfusion reaction related to antigen incompatibility.

20996

A 56-year-old man is brought to Accident and Emergency (A&E) one evening by the police, having been arrested for breach of the peace. He had been found wandering along the street shouting at passers-by, and had then proceeded to vomit over a parked car. Since his arrest, he has become increasingly confused and agitated, complaining of headache and nausea, and vomiting profusely. He was not known to have any past medical history, but was well-known to the police as having no fixed abode, and would be frequently picked up by the police when drunk. The police decided to bring the patient to A&E as his agitation and vomiting have been worsening.

On arrival in A&E, he is disorientated and confused. On examination, he is unkempt, and his breath smells of ketones. He is afebrile. His heart rate is 90 bpm, regular, and blood pressure is 116/70 mmHg. Heart sounds are normal. His respiratory rate is 28/min, but his chest is clear. Oxygen saturations are 96% on air. Abdominal examination reveals mild epigastric tenderness but no guarding or rebound. He is uncooperative with neurological examination, and apart from complaints of blurred vision, and dilated, sluggish pupils, no focal signs are elicited.

His investigations are as follows:

Hb	12.6 g/dl
WBC	6.7 $\times 10^9$/l
PLT	268 $\times 10^9$/l
Na^+	135 mmol/l
K^+	5.2 mmol/l
Urea	7.6 mmol/l
Creatinine	116 μmol/l
Cl^-	106 mmol/l
HCO_3^-	11 mmol/l

PLT	268 ×10⁹/l
Na^+	135 mmol/l
K^+	5.2 mmol/l
Urea	7.6 mmol/l
Creatinine	116 µmol/l
Cl^-	106 mmol/l
HCO_3^-	11 mmol/l
Glucose	4.6 mmol/l
Lactate	3.6 mmol/l (0.6 - 1.7)
ECG	Normal sinus rhythm
ABG (air)	PaO_2 13.6 kPa, $PaCO_2$ 4.4 kPa, pH 7.24
Urinalysis	No crystals seen

He is started on sodium bicarbonate IV in an attempt to correct his acidosis.

Which of the following is the most appropriate next treatment?

A IV thiamine

B IV tazocin

C IV ethanol

D IV naloxone

E IV dexamethasone

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B	IV tazocin
C	IV ethanol
D	IV naloxone
E	IV dexamethasone

Explanation

C	IV ethanol

This patient has methanol toxicity. Methanol is sometimes used as a substitute for ethanol by alcoholics, as it similarly [illegible] inebriat[illegible] The met[illegible]tes o[illegible] pro[illegible]

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Question 32 of 218

C IV ethanol

This patient has methanol toxicity. Methanol is sometimes used as a substitute for ethanol by alcoholics, as it similarly causes inebriation. The metabolites of methanol produce metabolic acidosis, blindness, and death after a characteristic latent period of 6-30 hours.

Methanol is slowly metabolised by alcohol dehydrogenase to formaldehyde, and subsequently by aldehyde dehydrogenase to formic acid. Systemic acidosis is caused by both formate and lactate. Both ethanol and methanol compete for the enzyme alcohol dehydrogenase and block metabolism of methanol to its toxic metabolites.

In the first few hours after ingestion, methanol-intoxicated patients present with inebriation and gastritis. Acidosis is not usually present because metabolism to toxic products has not occurred yet. There may be a noticeable elevation in the osmolar gap. After a latent period of up to 30 hours, severe anion gap metabolic acidosis, visual disturbances, blindness, seizures, coma and death may occur. Fundoscopic examination may reveal disc hyperaemia, venous engorgement or papilloedema.

Diagnosis is based on history, symptoms, large anion gap, serum methanol and serum formate levels. Treatment includes correction of the acidosis with IV bicarbonate, and administration of IV ethanol or fomepizole which saturate the enzyme alcohol dehydrogenase and prevent metabolism of methanol. Haemodialysis may be necessary to rapidly remove methanol and formate.

A IV thiamine

IV thiamine is essential in the treatment of Wernicke-Korsakoff syndrome, and should therefore be considered here, but it will not correct the acidosis or prevent methanol-related optic nerve damage.

Rana Alnasser's screen

blindness, seizures, coma and death may occur. Fundoscopic examination may reveal disc hyperaemia, venous engorgement or papilloedema.

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A	IV thiamine

IV thiamine is essential in the treatment of Wernicke-Korsakoff syndrome, and should therefore be considered here, but it will not correct the acidosis or prevent methanol-related optic nerve damage.

B	IV tazocin

There are no signs of sepsis to indicate a need for broad-spectrum antibiotics.

D	IV naloxone

IV naloxone is the first-line intervention for the treatment of opiate overdose.

E	IV dexamethasone

IV corticosteroids would be considered where there is evidence of cerebral oedema or adrenal crisis. It does not prevent the optic neuropathy associated with methanol intoxication.

A 28-year-old car mechanic, who specialised in battery repair, is admitted with history of episodic abdominal pain for the past six months. This time, he had a severe episode and was admitted to a surgical unit for evaluation. He has a history of anorexia, constipation and intermittent nausea and vomiting from the inception of his illness.

He has also found it increasing difficult to use his gadgets, due to weakness of hands, for the past three weeks.

A medical registrar's opinion was sought. On examination, he was alert but apprehensive. Cranial nerves were normal. The distal muscles of his limbs were weak. Upper limbs were 3/5, mainly extensor group and in the lower limbs, ankle dorsiflexors were 4±5. Tendon stretch reflexes were absent. Plantar responses were flexor. Sensory system was intact.

Investigations:

WCC	8.0 × 10^9/l
Hb	10 g/dl
MCV	65 fl
MCH	26 pg
MCHC	29 g/dl
Erythrocytes	3.5 × 10^{12}/l
Fasting blood glucose	5.5 mmol/l
Na^+	135 mmol/l
K^+	3.6 mmol/l
Urinanalysis	Glucose ++, amino acids +

Which of the following investigations would confirm the suspected diagnosis?

A Serum cadmium

Rana Alnasser's screen

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Fasting blood glucose	5.5 mmol/l
Na^+	135 mmol/l
K^+	3.6 mmol/l
Urinanalysis	Glucose ++, amino acids +

Which of the following investigations would confirm the suspected diagnosis?

A	Serum cadmium
B	Serum magnesium
C	Serum copper
D	Serum lead
E	24 h urinary copper excretion

32855

D Serum lead

This scenario is typical of chronic lead poisoning in adults. A combination of gastrointestinal symptoms with pure motor polyneuropathy and predominantly bilateral wrist drop should raise the suspicion of this toxicity. There is usually a microcytic anaemia, proximal renal tubular acidosis and amino acid leak. Moderate poisoning occurs at blood lead concentrations of 450–750 µgm/l. Basophilic stippling may be seen. Because lead inhibits the conversion of delta-aminolevulinic acid dehydrase and ferrochelatase, delta-aminolevulinic acid cannot be converted to porphobilinogen, and iron is not incorporated into protoporphyrin. Hence, erythrocyte protoporphyrin is elevated to levels >35 mcg/dl, a finding that is also common in iron deficiency anaemia. The most important aspect of management is to remove the patient from the source of lead poisoning. Chelation therapy with oral DMSA (2–3 dimercaptosuccinic acid) or IV EDTA (sodium calcium edetate) should be discussed with a poison centre.

A Serum cadmium

Cadmium toxicity is seen less frequently than inadvertent lead exposure, although the pictures seen with respect to renal impairment and proximal renal tubular acidosis are similar.

B Serum magnesium

Symptoms of magnesium toxicity are similar to those of calcium toxicity with nausea, vomiting, depression and lethargy, rather than the picture of renal tubular acidosis and microcytic anaemia seen here.

C Serum copper

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B Serum magnesium

Symptoms of magnesium toxicity are similar to those of calcium toxicity with nausea, vomiting, depression and lethargy, rather than the picture of renal tubular acidosis and microcytic anaemia seen here.

C Serum copper

Copper toxicity is rare, and is usually seen in association with cooking of acid foods in copper cooking utensils or with exposure to copper in water. Symptoms of very long-term copper exposure include hepatic dysfunction.

E 24 h urinary copper excretion

This is most useful in screening for patients with Wilson's disease.

Question 34 of 218

A 66-year-old woman is admitted with a febrile illness of one week's duration. She was prescribed amoxicillin for cough and right-sided pleuritic pain but had not complete the course. One day ago, she developed a severe headache and became more confused. She was diagnosed with diabetes mellitus some ten years ago and is managed with metformin and sitagliptin.

On examination there is obvious herpes labialis, her BP is 100/80 mmHg and pulse is 88 and regular. She is pyrexial with a temperature of 38.8 °C. Her GCS is 13 and there is obvious neck stiffness and meningism. Fundi are not seen. Auscultation reveals basal crackles at the right lung base.

Investigations:

Hb	12.0 g/l
WCC	15×10^9/l
Na^+	135 mmol/l
K^+	3.6 mmol/l
Urea	8 mmol/l
ALT	44 U/l
Urine	glucose ++, no ketones

What is the most likely cause of the lung findings here?

A	Cryptococcus
B	Listeria monocytogenes
C	Streptococcus pneumoniae
D	Staphylococcus aureus

This lady has a febrile illness with signs of consolidation of the right base of the lung with leucocytosis, suggestive of community-acquired pneumonia, the most common of which is *S. pneumoniae*. She has developed signs of bacterial meningitis and her level of consciousness has deteriorated. Herpes labialis is also commonly associated with *S. pneumoniae* infection. CT scanning should be carried out to exclude signs of raised intracerebral pressure, and to assess the risks of lumbar puncture to confirm the diagnosis of *S. pneumoniae* meningitis and rule out potential herpes encephalitis.

A	Cryptococcus

Cryptococcus is a cause of meningitis in patients who are immunocompromised.

B	Listeria monocytogenes

Listeria is a cause of meningitis, primarily in pregnant women and the elderly.

D	Staphylococcus aureus

S. aureus pneumonia is usually seen in association with influenza infection.

E	Mycoplasma pneumoniae

Mycoplasma pneumoniae is a rarer cause of community-acquired pneumonia, and is often associated with much more marked changes on CXR than would be expected given the examination findings.

32662

A 42-year-old homeless man is admitted to the Emergenc
Department having been found collapsed outside a nightclub. He is hypoxic, confused and extremely unwell.

His blood pressure (BP) is 100/70 mmHg, with pulse 97/min and regular. Respiratory rate is 32/min. Pulse oximetry reveals oxygen saturations of 84%. In his pocket i
an empty flask of amyl nitrite.

Which of the following represents the best treatment to reverse his tissue hypoxia?

A Methylene blue

B Hyperbaric oxygen

C Intubation and ventilation

D Non-invasive positive pressure ventilation (NIPPV)

E GTN infusion

Question 35 of 218

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Which of the following represents the best treatment to reverse his tissue hypoxia?

Your answer was correct

A	Methylene blue
B	Hyperbaric oxygen
C	Intubation and ventilation
D	Non-invasive positive pressure ventilation (NIPPV)
E	GTN infusion

Explanation

A Methylene blue

This patient has methaemoglobinaemia as a result of ingestion of amyl nitrite. Amyl nitrite promotes the formation of methaemoglobin, which avidly conserves oxygen and leads to decreased tissue oxygen saturations. Treatments of choice include methylene blue and vitamin C. These act by reducing methaemoglobin to haemoglobi

Rana Alnasser's screen

A Methylene blue

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B Hyperbaric oxygen

In other circumstances, for example carbon monoxide overdose, hyperbaric oxygen may improve tissue delivery of O_2 but where there is methaemoglobinaemia, it has littl impact.

C Intubation and ventilation

Methaemoglobinaemia means that even under conditions of artificial ventilation, oxygen delivery cannot be improved.

D Non-invasive positive pressure ventilation (NIPPV)

Because O_2 is avidly bound to methaemoglobin, NIPPV does not improve tissue hypoxia.

E GTN infusion

Infusion of further nitrate has no positive impact in the treatment of methaemoglobinaemia. It may reduce blood pressure further and have a negative impact on outcomes.

A 17-year-old girl is admitted to hospital having taken a paracetamol overdose. The precipitant was an argument with her boyfriend which ended in them splitting up. She took 24 × 500 mg tablets of paracetamol with a bottle of cider.

The following morning, she regretted her actions and told her parents what she had done.

On further evaluation, which of the following would be most likely to prompt specialist liver unit referral in this patient?

A	INR 1.8
B	pH 7.35
C	Creatinine 330 µmol/l
D	Serum ALT > 3000 IU/l
E	Systolic blood pressure 90 mmHg

6398

C Creatinine 330 µmol/l

The cut off for creatinine in the context of paracetamol toxicity is 300 µmol/l. Studies have shown that where creatinine is >300 µmol/l at presentation, mortality approaches 80% (survival is 23% in one case series).

Paracetamol overdose causes hepatic injury through its reactive metabolite *N*-acetylbenzoquinoneimine (NAPQI), which is normally rapidly detoxified by glutathione in liver cells. In overdose, NAPQI production exceeds glutathione capacity, and the metabolite reacts directly with hepatic macromolecules, causing liver injury. Renal damage may occur by the same way, owing to renal P450 metabolism. Ingestion of more than 6–7 g in adults is potentially hepatotoxic.

Treatment includes oral activated charcoal if the patient presents within 1 hour of ingestion. Antidotal treatment is with *N*-acetylcysteine (Parvolex®). Methionine can be used in patients allergic to *N*-acetylcysteine.

A INR 1.8

The INR conveys the synthetic function of the liver and is the most accurate marker for severity of liver damage. Poo prognostic signs, and thus indications for transfer to a live unit, include: INR >2 within 48 hours, INR >3.5 within 72 hours.

B pH 7.35

Paracetamol overdose is associated with lactic acidosis, and it is a pH of <7.3 which is associated with the poorest outcome.

the most accurate marker for severity of liver damage. Poo prognostic signs, and thus indications for transfer to a live unit, include: INR >2 within 48 hours, INR >3.5 within 72 hours.

B	pH 7.35

Paracetamol overdose is associated with lactic acidosis, and it is a pH of <7.3 which is associated with the poorest outcome.

D	Serum ALT > 3000 IU/l

Although significantly elevated transaminases are indicative of hepatocellular damage, it is impairment of hepatic synthetic function which most stratifies poor prognostic outcome.

E	Systolic blood pressure 90 mmHg

Systolic BP <80 mmHg is associated with the worst outcomes in patients with paracetamol overdose.

You are asked to review a 73-year-old man who complains of failure to maintain his erection during sexual intercourse over the past two months. He has a history of psychiatric disorder, for which he is treated with lithium, type 2 diabetes diagnosed some three years earlier, managed wit diet and metformin, and angina, for which atenolol was recently added, and angiotensin-converting enzyme (ACE inhibition for blood pressure and renoprotection.

Blood pressure is 145/85 mmHg; recent haemoglobin A1c (HbA1c) was measured at 75.96 mmol/mol (9.1%).

Which of the following would represent the most likely cause of his deteriorating sexual function over the past two months?

A	Vascular disease
B	Lithium therapy
C	Beta-blocker therapy
D	Metformin therapy
E	ACE inhibitor therapy

Question 37 of 218

E ACE inhibitor therapy

Explanation

C Beta-blocker therapy

It is likely that he has some pre-existing vascular disease affecting the blood supply to the penis, but the acute cause of his deteriorating sexual function is likely to be the beta-blocker therapy. Switching the atenolol to a cardioselective beta blocker such as bisoprolol, or a non-beta blocker therapy for his angina, should result in an improvement in his erectile function.

A Vascular disease

Given he has only been diagnosed with type 2 diabetes for 3 years, significant vascular disease leading to erectile dysfunction is unlikely.

B Lithium therapy

Lithium therapy is associated with diabetes insipidus, not with erectile dysfunction.

D Metformin therapy

Metformin therapy is not associated with vascular dysfunction and may indeed be associated with improvement in vasoreactivity.

E ACE inhibitor therapy

ACE inhibitors are protective against micro- and macrovascular disease in diabetes, and are not associated with erectile dysfunction.

A 27-year-old man is admitted, following an overdose, having taken 70 of his amitriptyline 25-mg tablets.

An electrocardiogram (ECG) rhythm strip is shown below.

Arterial blood gases reveal a pH of 7.15.

Which of the following represents the best treatment option?

A Intravenous (IV) lidocaine

B IV sotalol

C IV magnesium sulfate

D IV sodium bicarbonate

E IV flecainide

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Which of the following represents the best treatment option?

Your answer was correct

A	Intravenous (IV) lidocaine
B	IV sotalol
C	IV magnesium sulfate
D	IV sodium bicarbonate
E	IV flecainide

Explanation

D IV sodium bicarbonate

IV sodium bicarbonate would be the treatment of choice i this case. Most class I antiarrhythmics are ineffective and may worsen conduction disorders. Phenytoin or lidocaine represent the best choices of antiarrhythmics, but ideally hypoxia or acidosis should be corrected first. Ventricular

Explanation

D IV sodium bicarbonate

IV sodium bicarbonate would be the treatment of choice in this case. Most class I antiarrhythmics are ineffective and may worsen conduction disorders. Phenytoin or lidocaine represent the best choices of antiarrhythmics, but ideally hypoxia or acidosis should be corrected first. Ventricular arrhythmias generally only develop when QRS is > 160 ms. Death may follow with as little as 1000 mg of tricyclic antidepressant ingestion.

A Intravenous (IV) lidocaine

Lidocaine is an important further option if short episodes of ventricular tachycardia (VT) persist despite correction o acidosis with sodium bicarbonate.

B IV sotalol

Sotalol prolongs the action potential and actually further increases the risk of VT occurring.

C IV magnesium sulfate

Magnesium sulfate is of most value in the treatment of torsades de pointes VT.

E IV flecainide

Flecainide, like sotalol, may actually increase the risk of an episode of VT occurring.

You are seen by a pharmaceutical representative who asks you to try out a recently launched antihypertensive agent in one of your patients. The second patient who tries the medication returns a few days later with rash.

In clinical trials up to phase 3, rash occurring with which o the following frequencies is likely to be identified?

A	1:10,000
B	1:300
C	1:20,000
D	1:2000
E	1:50,000

B 1:300

In general, about 10 times as many patients need to be studied in a trial program versus the number needed to see one event from a frequency calculation. Most modern clinical study programmes for drugs with a cardiovascular disease indication study between 5 and 10,000 patients. Hence an event occurring with a frequency of 1 in 300 should be identified.

A 1:10,000

Events occurring with this type of frequency are only reliably confirmed in post-marketing surveillance via the Medicines and Healthcare Regulatory Agency (MHRA). The yellow card system invites healthcare professionals to report suspected adverse drug reactions, complementary to this system is prescription event monitoring, where doctors identified from a sample of scripts for a particular medicine are surveyed for any changes in clinical markers in patients given that medicine.

C 1:20,000

Events occurring with this frequency may only be identified significantly after launch, particularly if they are related to prolonged drug exposure.

D 1:2000

In this frequency a numerical imbalance between arms may be seen in the phase 3 study program, but it's unlikely a difference could be reliably confirmed between active and placebo.

E 1:50,000

A 54-year-old patient post renal transplant is taking azathioprine as part of his immunosuppressive regime and he develops gout. He is reviewed by his general practitioner (GP), who prescribes allopurinol. He is admitted with aplastic anaemia.

Which of the following stems fits best as the cause of his bone marrow failure?

A	Azathioprine toxicity
B	Allopurinol toxicity
C	Acute viral infection
D	Mercaptopurine toxicity
E	Xanthine oxidase upregulation

6566

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- A Azathioprine toxicity
- B Allopurinol toxicity
- C Acute viral infection
- D Mercaptopurine toxicity
- E Xanthine oxidase upregulation

Explanation

D Mercaptopurine toxicity

Azathioprine is metabolised to 6-mercaptopurine (6-MP), which itself is metabolised by xanthine oxidase. Xanthine oxidase inhibition leads to accumulation of 6-MP which then precipitates bone marrow failure. This may be potentially fatal if unrecognised. Ideally concomitant medication should be altered to reduce the risk of gout rather than using allopurinol in this situation.

Rana Alnasser's screen

D Mercaptopurine toxicity

Azathioprine is metabolised to 6-mercaptopurine (6-MP), which itself is metabolised by xanthine oxidase. Xanthine oxidase inhibition leads to accumulation of 6-MP which then precipitates bone marrow failure. This may be potentially fatal if unrecognised. Ideally concomitant medication should be altered to reduce the risk of gout rather than using allopurinol in this situation.

A Azathioprine toxicity

Allopurinol does not interfere with the metabolism of azathioprine itself, but interferes with the metabolism of mercaptopurine, one step on from initial azathioprine metabolism.

B Allopurinol toxicity

Bone marrow failure here is not due to accumulation of allopurinol, it is due to accumulation of 6-mercaptopurine.

C Acute viral infection

Although acute viral infection can lead to bone marrow failure, this is more usually seen against a background of sickle cell disease or hereditary spherocytosis.

E Xanthine oxidase upregulation

Xanthine oxidase inhibition is responsible for accumulation of mercaptopurine.

3G 8:11

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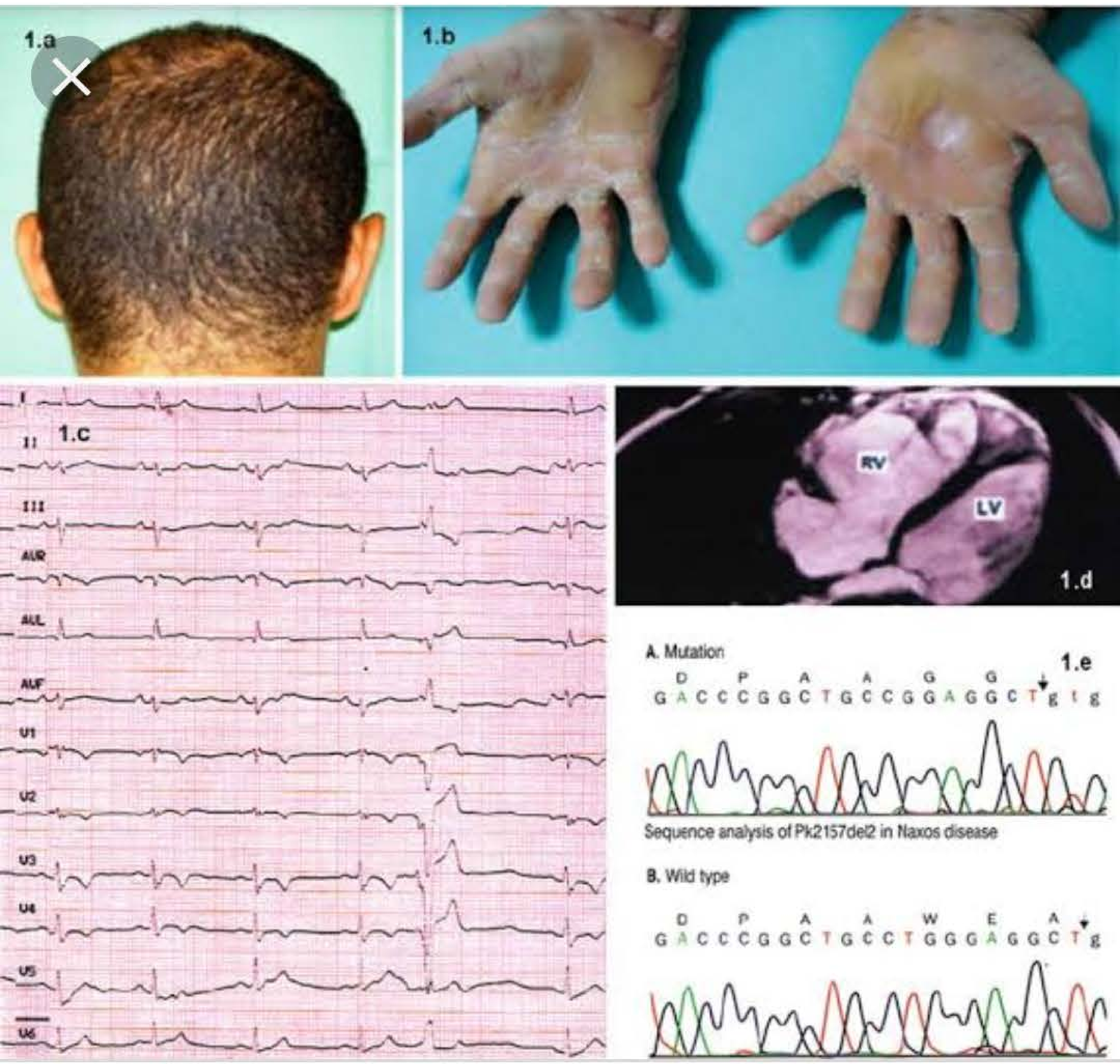
17


1.a
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1.d
A. Mutation
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D P A A G G
G A C C C G G C T G C C G G A G G C T g t g
Sequence analysis of Pk2157del2 in Naxos disease
B. Wild type
D P A A W E A
G A C C C G G C T G C C T G G G A G G C T g

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a, b Patient's characteristic phenotype including woolly hair...

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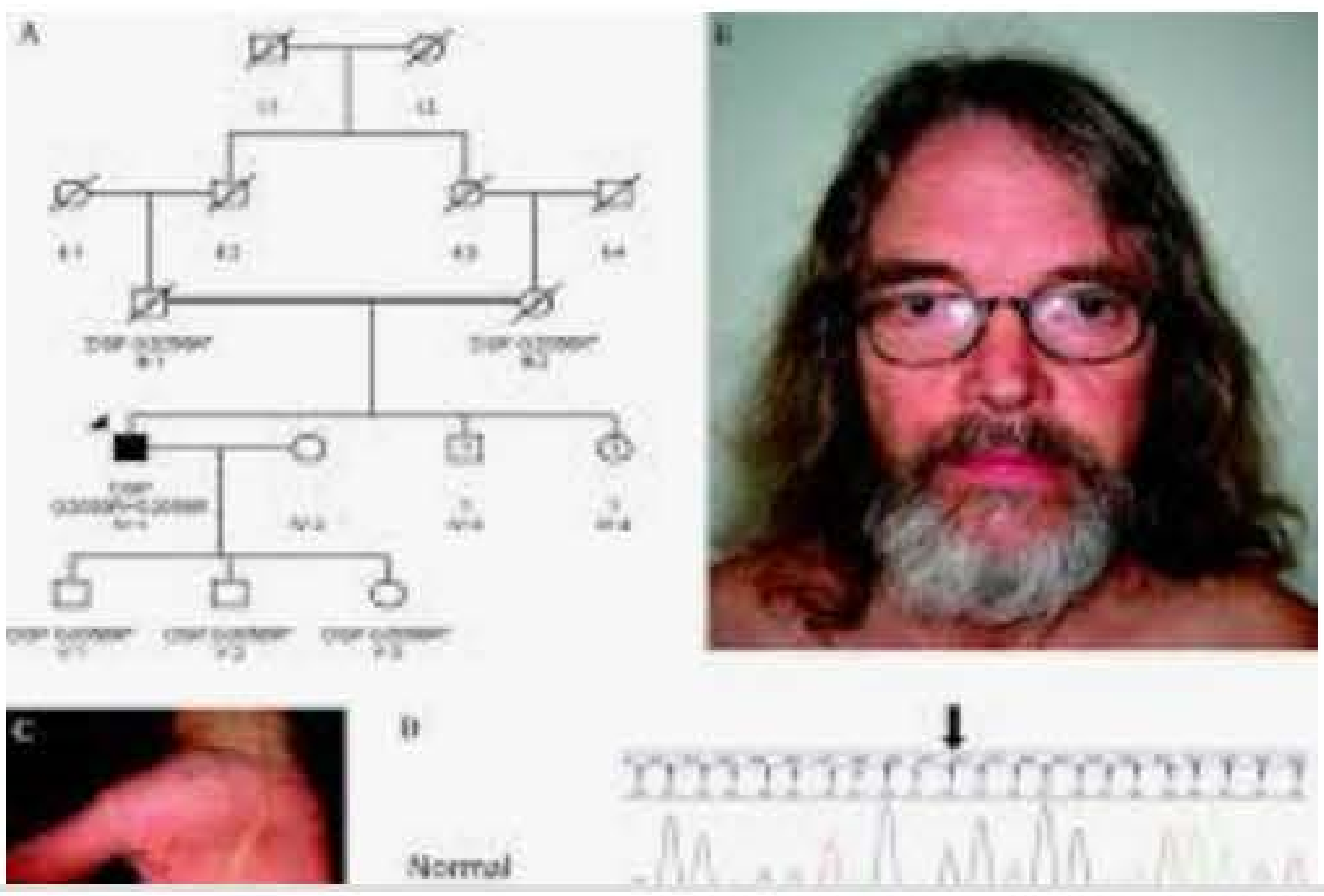

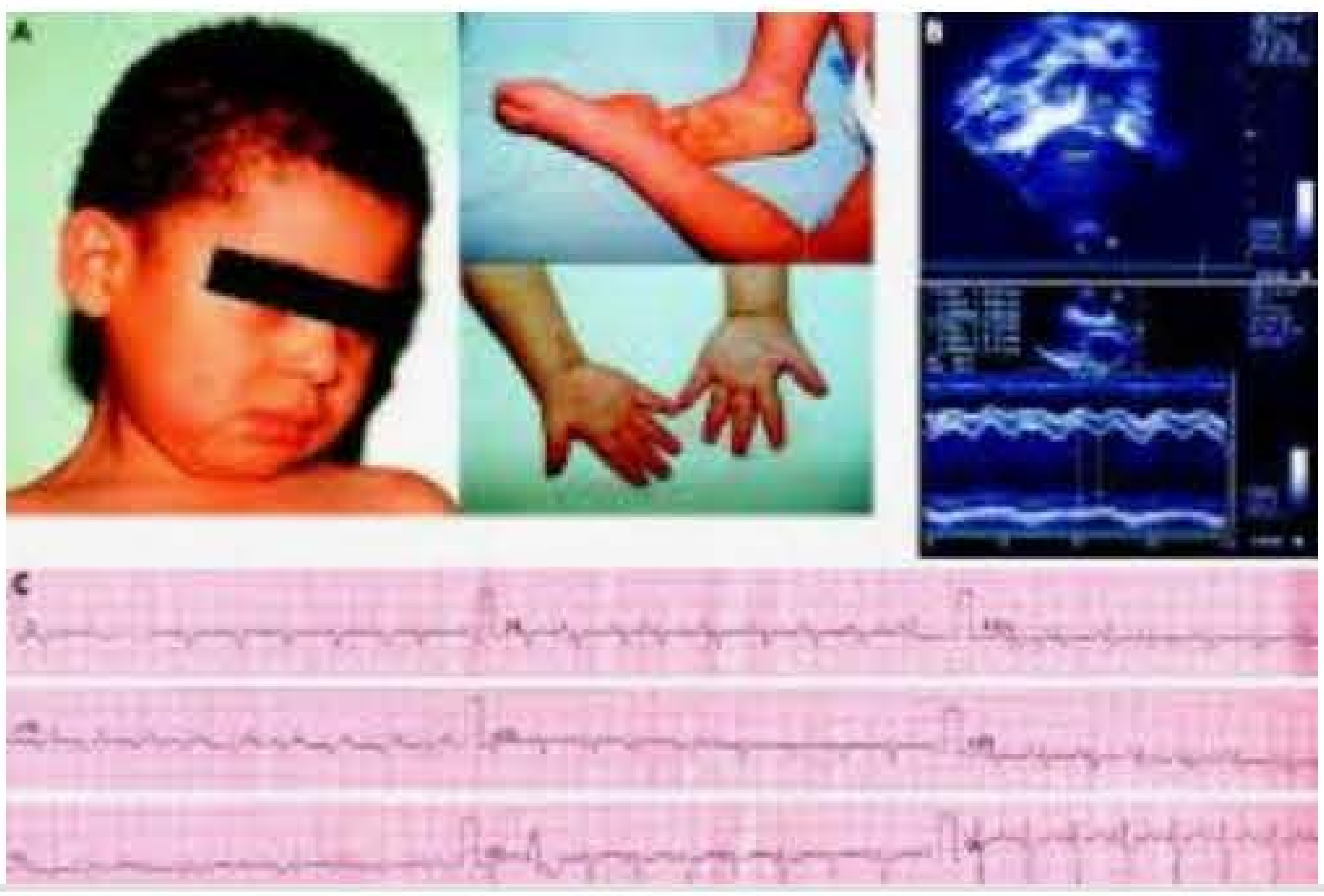

An 18-year-old woman is admitted after a collapse at a nightclub. Her friends tell you that she does not drink alcohol. She was out celebrating her birthday with friends. Apparently, she was looking for water to drink and seemed a little confused just before she collapsed.

On examination, she is pyrexial (40 °C) and unconscious. She has bilateral dilated pupils. Her blood pressure (BP) is 165/92 mmHg and her pulse is 110/min.

Investigations:

		Normal Values
Hb	14.9 g/dl	
WCC	6.9 × 10^9/l	
PLT	72 × 10^9/l	
Na^+	140 mmol/l	
K^+	6.0 mmol/l	
Creatinine	190 μmol/l	
CK	1210 u/l	24-170
Urine	Blood ++, no red cells on microscopy	

Which of the following is the most likely diagnosis?

A Neuroleptic malignant syndrome

B Malignant hyperthermia

C Serotonin syndrome

D 3,4-methylenedioxymethamphetamine (MDMA)

		Normal Values
Hb	14.9 g/dl	
WCC	6.9 × 10^9/l	
PLT	72 × 10^9/l	
Na^+	140 mmol/l	
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Creatinine	190 μmol/l	
CK	1210 u/l	24-170
Urine	Blood ++, no red cells on microscopy	

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B	Malignant hyperthermia
C	Serotonin syndrome
D	3,4-methylenedioxymethamphetamine (MDMA) toxicity
E	Cocaine toxicity

21195

Question 1 of 178

D 3,4-methylenedioxymethamphetamine (MDMA) toxicity

Given the popularity of MDMA (ecstasy), it seems most likely that she will have had access to it at her birthday party. The picture of extreme hyperthermia, rhabdomyolysis, renal impairment, low platelets and decreased consciousness level with dilated pupils is typical of the condition. Initial basic life support with assessment of ABC is crucial, with benzodiazepines the main agents used for sedation and for control of seizures. Hypertension is managed aggressively with agents such as phentolamine and sodium nitroprusside. Where there is significant rhabdomyolysis as in this case, urinary alkalinisation may reduce progression to acute kidney disease.

A Neuroleptic malignant syndrome

This is most often seen in patients prescribed conventional dopamine antagonist anti-psychotic medication, and this is very rarely seen as a drug of abuse.

B Malignant hyperthermia

Malignant hyperthermia is seen in response to anaesthetic agents, particularly in patients with inherited neuromuscular disorders.

C Serotonin syndrome

Serotonin syndrome is associated with SSRIs, prescribed for depression, which are not associated with an immediate neuropsychological impact, and therefore not used as drugs of abuse.

E Cocaine toxicity

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C Serotonin syndrome

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E Cocaine toxicity

Cocaine toxicity can be associated with hypertension, tachycardia and rhabdomyolysis, but access to it as a drug of abuse is less than for MDMA.

2N95

A 27-year-old woman, who is 16 weeks pregnant, is referred by her GP with hypertension. The midwife noted her booking visit BP to be 135/82 mmHg, and it is now 155/92 mmHg. She has no previous significant medical history, but is overweight with a BMI of 28.

Investigations:

Hb	11.4 g/dl
WCC	5.4 × 10^9/l
PLT	201 × 10^9/l
Na+	141 mmol/l
K+	4.9 mmol/l
Creatinine	92 µmol/l

You elect to start treatment. Which of the following is the most appropriate therapy for her?

A	Valsartan
B	Bendroflumethiazide
C	Labetalol
D	Nifedipine
E	Nitroprusside

blockers such as atenolol, it isn't associated with intra-uterine growth retardation.

A Valsartan

Valsartan is contraindicated due to the risk of renal agenesis and subsequent fetal death. This is true for the ACE inhibitor and ARB classes.

B Bendroflumethiazide

Diuretics interfere with natural volume expansion associated with pregnancy and are associated with increased risk of renal tract abnormalities.

D Nifedipine

There is evidence to support the use of dihydropyridines in pregnancy, although they are the second or third choice option for patients who are unable to take beta blockers or methyldopa.

E Nitroprusside

This is a consideration for acute management of hypertension and is delivered intravenously.

An 18-year-old man, the son of a farmer, is admitted with a history of progressive weight loss, anorexia, nausea and constipation for the past four months. He had recently been taking a keen interest in helping his father to eradicate mice from their grain storage silos.
He also had episodes of headaches and was at times losing his way around his home for a few minutes, though subsequently would recover completely.

He had also been aware of numbness in his toes for the past two months.

On examination, he had thickened palms and some transverse lines were evident on his nails.

He was alert and cooperative. Mild weakness and wasting was evident in the small muscles of his feet. Tendon reflexes were absent and plantar responses were flexor. Diminished sensation to pinprick was seen in the distal feet and fingertips.

What is the most likely diagnosis?

A Acute intermittent porphyria
B Coproporphyria
C Erythropoietic protoporphyria
D Arsenic poisoning
E Lead poisoning

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A	Acute intermittent porphyria
B	Coproporphyria
C	Erythropoietic protoporphyria
D	Arsenic poisoning
E	Lead poisoning

Explanation

D Arsenic poisoning

D Arsenic poisoning

This patient has been involved in distributing rodent pesticides over a period of at least 4 months. He has developed weight loss, gastrointestinal symptoms, hyperkeratosis of the palms and some transverse lines on the nails. probably suggestive of Mees' lines. He also has features of a sensorimotor polyneuropathy.
All of these symptoms fit very well with chronic arsenic poisoning. There is increased risk of cancers in such patients. Arsenic can be detected in the hair and nails for months following exposure. Dimercaptosuccinic acid (DMSA, succimer) and penicillamine have been used successfully in the treatment of arsenic poisoning. The family should of course be warned about the safe handling of poisons.

A Acute intermittent porphyria

AIP is associated with acute episodes of hypertension and hyponatraemia, accompanied by psychiatric symptoms. As such, it doesn't fit with the picture seen here.

B Coproporphyria

Coproporphyria, like AIP, is an acute porphyria associated with acute episodes of abdominal pain and psychological disturbance. It is, however, also associated with a skin rash, unlike AIP.

C Erythropoietic protoporphyria

EP presents with a photosensitive skin rash and hepatic dysfunction.

E Lead poisoning

senic keratoses (below) on the palms of a p
gested arsenic from a contaminated well ove
olonged period (photo courtesy Dr. Joseph C

Agency for Toxic Substances and Disease Registry - CDC

enic Toxicity Case Study: What are the Physiologic Effects of

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eratoses (below) on the palms of a patient who
arsenic from a contaminated well over a
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1.7 After debriding the lesion during the follow up

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A 34-year-old woman with human immunodeficiency virus (HIV) is reviewed in clinic six weeks after starting highly active antiretroviral therapy (HAART). She had been feeling clinically well prior to starting therapy, but over the past fortnight has been feeling increasingly tired and weak. She is also complaining of exertional dyspnoea.

She denies fever, chest pain or cough. She has no other previous medical history of note, and is taking tenofovir, emtricitabine and elvitegravir/cobicistat, along with co-trimoxazole for prophylaxis against *Pneumocystis jirovecii* pneumonia.

Her blood results are as follows:

Test	Pre-treatment	After six weeks
Hb	13.2g/dl	8.6 g/dl
MCV	95 fl	102 fl
CD4	205	266

What is the most likely cause for the anaemia?

A	Bone marrow infiltration by Mycobacterium avium-intracellulare (MAI)
B	Haemolytic anaemia with anti-erythrocyte antibodies
C	Folic acid deficiency
D	Red cell hypoplasia
E	Erythropoietin suppression

D	Red cell hypoplasia

The anaemia associated with emtricitabine therapy is due to red cell hypoplasia or aplasia. This is seen more rarely than with zidovudine and lamivudine and more frequently in children than in adults. Bone marrow examination may demonstrate pure red cell aplasia, erythroid maturation arrest, erythroid hypoplasia, and megaloblastic erythropoiesis. Erythropoietin levels are normal or increased.

C	Folic acid deficiency

Folate deficiency is usually only seen with co-trimoxazole therapy when it is given concurrently with other anti-folate drugs such as methotrexate.

A	Bone marrow infiltration by Mycobacterium avium-intracellulare (MAI)

Given this patient has commenced treatment and has seen an improvement in their CD4 count, infiltration by MAI is unlikely versus other causes of anaemia.

B	Haemolytic anaemia with anti-erythrocyte antibodies

Overt haemolysis is rarely seen in the context of HIV infection, and is likely to be less common once HAART is initiated.

E	Erythropoietin suppression

Levels of erythropoietin are usually increased in patients with red cell hypoplasia.

A 30-year-old lady with known recurrent attacks of migraine presents to Accident and Emergency complaining of central dull chest pain. She normally takes amitriptyline, and started sumatriptan for the acute attack. She has just returned from a holiday in Spain.

Her examination is normal with all observations within normal range. Initial blood tests reveal normal haematology and biochemistry. Both D-dimer and troponin T assays are within the normal range and chest X-ray is normal. 12-lead ECG is unremarkable.

What is the most appropriate course of action?

A Start heparin and arrange a ventilation/perfusion scan
B Obtain a psychiatric opinion
C Stop sumatriptan
D Arrange a gastroscopy
E Reassure and discharge

A 30-year-old lady with known recurrent attacks of migraine presents to Accident and Emergency complaining of central dull chest pain. She normally takes amitriptyline, and started sumatriptan for the acute attack. She has just returned from a holiday in Spain.

Her examination is normal with all observations within normal range. Initial blood tests reveal normal haematology and biochemistry. Both D-dimer and troponin T assays are within the normal range and chest X-ray is normal. 12-lead ECG is unremarkable.

What is the most appropriate course of action?

Your answer was correct

A	Start heparin and arrange a ventilation/perfusion scan
B	Obtain a psychiatric opinion
C	Stop sumatriptan
D	Arrange a gastroscopy
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Explanation

C Stop sumatriptan

Sumatriptan has been associated with chest pain, and various studies have suggested up to 17% of people taking it report chest pain, possibly due to vasospasm.

C Stop sumatriptan

Sumatriptan has been associated with chest pain, and various studies have suggested up to 17% of people taking it report chest pain, possibly due to vasospasm. Furthermore, sumatriptan has been associated with myocardial infarctions and is contraindicated in people with known ischaemic heart disease (IHD). Although troponin is normal today, this patient would be considered at significant risk of a myocardial infarction in the coming months.

A Start heparin and arrange a ventilation/perfusion scan

Given the chest pain is dull and retrosternal in nature, it is much more consistent with cardiac chest pain. As such a VQ is not indicated.

B Obtain a psychiatric opinion

Given the strong link between sumatriptan and vasospasm, symptomatic cardiac chest pain should be excluded first before a functional disorder and psychiatric referral are considered.

D Arrange a gastroscopy

Although reflux oesophagitis may cause similar pain, the link between sumatriptan and cardiac vasospasm should be explored first before considering gastroscopy.

E Reassure and discharge

This runs the risk of the patient returning with an NSTEMI due to vasospasm over the next few months.

A 69-year-old man is admitted to the Emergency Department with palpitations and syncope. He has a history of end-stage COPD for which he takes high-dose seretide and tiotropium, and uses home oxygen. He had an inferior myocardial infarction some 5 years earlier.

On examination, his BP is 100/50 mmHg, with pulse 135/min, and atrial fibrillation. There are bilateral crackles on auscultation of the chest consistent with left ventricular failure, and widespread wheeze. He has bilateral ankle swelling.

Investigations:

Hb	12.7 g/dl
WCC	11.1 × 10^9/l
PLT	201 × 10^9/l
Na^+	138 mmol/l
K^+	4.3 mmol/l
Creatinine	115 micromol/l
Glucose	6.7 mmol/l
ECG	Fast AF, antero-lateral ST depression

He is given IV furosemide.

Which other intervention is most appropriate?

A	IV flecainide
B	IV amiodarone
C	IV digoxin
D	Oral bisoprolol

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D	Oral bisoprolol
E	Oral verapamil

C IV digoxin

This patient has long-term COPD and, as such, he is very likely to have significant atrial dilatation and chronic AF. In this case rate control is the most appropriate intervention. Given that his BP is borderline low at 100/50 mmHg and there are signs of LVF, digoxin, which is a mildly positive inotrope, is the best option.

A IV flecainide

Flecainide is indicated for new onset AF in the absence of significant structural or ischaemic heart disease, which is clearly not the case here.

B IV amiodarone

Amiodarone is indicated for rhythm control in patients with paroxysmal AF who have a history of IHD. In this scenario, rate control is the desired intervention.

D Oral bisoprolol

Although bisoprolol is indicated for rate control in AF, in this stage with unstable blood pressure and signs of cardiac failure, it may worsen symptoms of LVF in the short term.

E Oral verapamil

Verapamil would have a significantly negative inotropic effect in this situation and is likely to worsen symptoms of heart failure and reduce systolic blood pressure further.

36472

Rate this question:

You are called to the resuscitation room by an anxious Emergency Department Senior House Officer. A middle-aged male farmer has been brought in by ambulance, and there is little history to be gained from the paramedics, but he appears extremely unwell.

He appears agitated, with pinpoint pupils, is sweating profusely, hypersalivating, and producing frothy white sputum. His wet trousers smell strongly of urine.

What is he most likely to have been poisoned with?

A Morphine

B Paraquat

C Organophosphate insecticide

D Venlafaxine

E Dosulepin

17157

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Your answer was correct

A	Morphine
B	Paraquat
C	Organophosphate insecticide
D	Venlafaxine
E	Dosulepin

Explanation

C Organophosphate insecticide

The **symptoms and signs** demonstrated are classical of the toxidrome seen in poisoning with a cholinomimetic agent. Organophosphate insecticides act as cholinesterase inhibitors, thereby increasing the amount of acetylcholine at various receptors by inhibiting its breakdown. The effects seen are due to the acetylcholine acting at

Explanation

C Organophosphate insecticide

The **symptoms and signs**+ demonstrated are classical of the toxidrome seen in poisoning with a cholinomimetic agent. Organophosphate insecticides act as cholinesterase inhibitors, thereby increasing the amount of acetylcholine at various receptors by inhibiting its breakdown. The effects seen are due to the acetylcholine acting at postganglionic parasympathetic nerve endings, on nicotinic receptors and on the central nervous system. Therapeutic strategies include the use of atropine, oximes (pralidoxime and obidoxime) and benzodiazepines.

A Morphine

Morphine is associated with respiratory depression, decreased consciousness and pinpoint pupils.

B Paraquat

Poisoning with paraquat may be associated with no symptoms initially, but it later presents with persistent vomiting, acidosis and kidney disease.

D Venlafaxine

Venlafaxine overdose is associated with tachycardia, seizures, vomiting and hypertension.

E Dosulepin

Dosulepin presents with the typical features of tricyclic antidepressant overdose, including decreased consciousness, seizures, progressive metabolic acidosis, long QT and consequent ventricular arrhythmias.

A 28-year-old patient on a methadone programme has newly moved into the area. He visits the general practitioner (GP) for a repeat prescription but is refused. He is known to abuse benzodiazepines. Two days later, he is admitted to the Emergency Department after being found having a generalised tonic-clonic seizure in the street.

On admission, he is hypertensive, soiled with diarrhoea and appears to have been vomiting.

Which of the following represents the best treatment for him with respect to hypertension and agitation?

A Fluoxetine

B Recommencement of methadone with specialist advice

C Diazepam as required for seizures

D Intravenous (iv) Diamorphine prn

E Dihydrocodeine as required

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Which of the following represents the best treatment for him with respect to hypertension and agitation?

Your answer was incorrect

A	Fluoxetine
B	Recommencement of methadone with specialist advice
C	Diazepam as required for seizures
D	Intravenous (iv) Diamorphine prn
E	Dihydrocodeine as required

Explanation

B	Recommencement of methadone with specialist advice

He clearly has an opiate withdrawal syndrome which reaches its peak on the second or third day after opiate abstinence. The syndrome may be characterised by severe

Explanation

B Recommencement of methadone with specialist advice

He clearly has an opiate withdrawal syndrome which reaches its peak on the second or third day after opiate abstinence. The syndrome may be characterised by severe agitation or muscular twitching, aches and pains, abdominal cramps, vomiting, diarrhoea, hypertension, insomnia, anorexia and profuse sweating. The most appropriate intervention is methadone, a long-acting opiate agonist, which because it is long acting is less likely to produce an opiate-related 'high'.

C Diazepam as required for seizures

Use of benzodiazepines may be required to manage seizures, but they will not treat underlying opiate withdrawal, and seizures are usually associated with benzodiazepine withdrawal, not with opiate abuse.

A Fluoxetine

Fluoxetine should not be used in this case, as it would reduce the threshold for further seizures.

D Intravenous (iv) Diamorphine prn

Diamorphine is short acting and likely to perpetuate the opiate addiction cycle in this patient.

E Dihydrocodeine as required

Like diamorphine, this is short acting and likely to perpetuate the opiate addiction cycle.

A 22-year-old Chinese man is started on phenytoin for epilepsy. He subsequently presents with a severe blistering skin rash and oral and genital ulceration.

On examination he is pyrexial (38.2 °C); his BP is 105/72 mmHg, with pulse is 85/min and regular. There are extensive target lesions and a number of de-roofed, blistered lesions.

Which of the following is his most likely HLA type?

A HLA A3101
B HLA B1502
C HLA B5701
D HLA B5801
E HLA DQ2

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Question 9 of 178

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E HLA DQ2

Explanation

B HLA B1502

HLA types related to drug reactions have appeared in a number of examinations over recent years, because they have featured in EMA and FDA alerts. HLA B1502 is associated with Stevens-Johnson syndrome in patients of Chinese origin taking phenytoin.

B	HLA B1502

HLA types related to drug reactions have appeared in a number of examinations over recent years, because they have featured in EMA and FDA alerts. HLA B1502 is associated with Stevens-Johnson syndrome in patients of Chinese origin taking phenytoin.

A	HLA A3101

A3101 is associated with Stevens-Johnson syndrome in European or Japanese patients treated with carbamazepine.

C	HLA B5701

HLA B5701 is associated with abacavir hypersensitivity, which resulted in the development of HLA screening before the medication was initiated for HIV.

D	HLA B5801

HLA B5801 is associated with allopurinol hypersensitivity.

E	HLA DQ2

DQ2 HLA type is associated with the development of dermatitis herpetiformis.

Question 10 of 178

A 42-year-old man is referred to a Dermatology Clinic with a rash which has developed over his arms over the past two weeks.

His past history includes hypertension, for which he takes lisinopril and bendroflumethiazide. He is also known to suffer from manic depression with significant psychotic episodes, and had been taking chlorpromazine for six years. He was reviewed by his psychiatrist six months ago, who started him on lithium. He has recently been complaining of some indigestion, and so his general practitioner (GP) started lansoprazole two months ago.

On examination, he has a scaly rash localised over the extensor aspects of his elbows.

Which agent is most likely to have precipitated his rash?

A Chlorpromazine

B Bendroflumethiazide

C Lanzoprazole

D Lithium

E Lisinopril

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Explanation

D Lithium

The rash is psoriasis, which can be precipitated by lithium. Drugs which are known to trigger or exacerbate psoriasis

Explanation

D Lithium

The rash is psoriasis, which can be precipitated by lithium. Drugs which are known to trigger or exacerbate psoriasis include lithium, antimalarials, nonsteroidal anti-inflammatory drugs (NSAIDs) and β-blockers. Lisinopril is also rarely associated with this adverse effect. Precipitation of the rash may take up to a year to develop after initiation of the medication. Treatment involves withdrawal of the causative agent, and the use of emollients, topical compresses or topical steroids. It may be necessary to use etretinate, methotrexate or phototherapy. Of course, lithium prescription with ACE inhibition is not recommended due to the problem of a significant increase in serum lithium levels.

A Chlorpromazine

Chlorpromazine is associated with dermatitis and urticaria, rather than with psoriasis.

B Bendroflumethiazide

Bendroflumethiazide is associated with exfoliative dermatitis and photosensitivity, rather than with psoriasis.

C Lanzoprazole

Lanzoprazole is associated with an urticarial rash, rather than with psoriasis.

E Lisinopril

Lisinopril is less likely to be associated with psoriasis than

A 24-year-old woman takes 48 × 300 mg aspirin tablets. She presents voluntarily to the Casualty Department around 1 h after her overdose, complaining of nausea. She is 62 kg in weight.

On examination in the Emergency Department, her blood pressure is 110/72 mmHg, her respiratory rate is 33/min.

Which one of the following features would you most expect to see?

A	Respiratory acidosis
B	Respiratory alkalosis
C	Diarrhoea
D	GI bleeding
E	Compensated metabolic acidosis

32814

B Respiratory alkalosis

Typical features of salicylate toxicity include sweating, epigastric pain, vomiting, epigastric tenderness, blurring of vision and tinnitus. Adults develop early respiratory alkalosis before the development of metabolic acidosis, hypocalcaemia and hyponatraemia or hypernatraemia.

A Respiratory acidosis

Respiratory acidosis is seen with overdoses of agents which cause respiratory depression, such as benzodiazepines and opiates.

C Diarrhoea

Vomiting rather than diarrhoea which is seen in the early period after aspirin overdose rather than diarrhoea.

D GI bleeding

GI bleeding is not a prominent early feature of aspirin overdose, but may be seen later as vomiting persists and acidosis develops further.

E Compensated metabolic acidosis

Compensated metabolic acidosis is also known as the second stage of acid base disturbance in aspirin overdose, and only seen a few hours after ingestion of the tablets.

An 18-year-old student attends the Emergency Department having ingested a couple of handfuls of tablets after an argument with her boyfriend, 2.5 h previously. She fully regrets her actions and does not want to die. She is unsure as to which tablets she has taken, but believes that they may have been painkillers.

On examination, she has a Glasgow Coma Score of 15, blood pressure (BP) is 122/80 mmHg, pulse is 78 and regular and, apart from being rather tearful, is asymptomatic.

Which of the following is the most useful next investigation?

A Liver function tests

B Paracetamol levels at 4 h

C Salicylate levels at 4 h

D International normalised ratio

E Arterial blood gas

7373

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Your answer was correct

A	Liver function tests
B	Paracetamol levels at 4 h
C	Salicylate levels at 4 h
D	International normalised ratio
E	Arterial blood gas

Explanation

B Paracetamol levels at 4 h

Paracetamol intoxication generally has no signs or symptoms in the initial time period post-overdose. Treatment depends on taking blood for paracetamol concentration, and relating this result to the nomogram in order to decide whether N-acetyl cysteine should be initiated. This probably offers full protection if administered within 15 h.

B	Paracetamol levels at 4 h

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A	Liver function tests

Liver function tests do not predict outcome in paracetamol overdose versus other investigations such as PT and renal function. They are of less value here.

C	Salicylate levels at 4 h

The absence of symptoms of salicylism, including hyperventilation and tinnitus, means that significant aspirin overdose is highly unlikely here.

D	International normalised ratio

INR is most predictive of outcomes in paracetamol overdose from the 24 h stage. Therefore, early after overdose it isn't of value with respect to outcomes prediction.

E	Arterial blood gas

Given there are no symptoms and the patient is cardiovascularly stable, there is little utility in testing arterial blood gas at this stage.

A patient with severe asthma visits you with a press cutting about a phase 2 study of a new pharmacological agent which he would like to take part in.

What is the main objective of a phase 2 study?

A Evaluation of efficacy in a pre-launch population

B First time in human study

C Dose ranging for efficacy surrogates, safety and tolerability in a patient population

D Initial pharmacokinetic (PK) assessment

E Assessment of drug-drug interaction

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C	Dose ranging for efficacy surrogates, safety and tolerability in a patient population
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E	Assessment of drug-drug interaction

Explanation

C Dose ranging for efficacy surrogates, safety and tolerability in a patient population

Phase 2 studies for a chronic condition such as asthma or diabetes commonly take place in around 500 patients and are designed to evaluate safety and toxicity and effective dose range and monitor pharmacokinetic and pharmacodynamic effects.

A Evaluation of efficacy in a pre-launch population

Phase 3 studies are designed to assess safety and efficacy

C Dose ranging for efficacy surrogates, safety and tolerability in a patient population

Phase 2 studies for a chronic condition such as asthma or diabetes commonly take place in around 500 patients and are designed to evaluate safety and toxicity and effective dose range and monitor pharmacokinetic and pharmacodynamic effects.

A Evaluation of efficacy in a pre-launch population

Phase 3 studies are designed to assess safety and efficacy in the pre-launch population, and for a chronic condition this may involve studying many thousands of patients for one year or more.

B First time in human study

This is a phase 1 study, which are increasingly, even outside an indication for cancer treatment, conducted in a relevant patient population.

D Initial pharmacokinetic (PK) assessment

Initial PK assessment is conducted in a phase 1 setting, with intensive blood sampling around single and multi-dose cohorts in humans.

E Assessment of drug-drug interaction

These are conducted for a relevant drug in the context of the patient population and the new agent being trialed. One agent is dosed to steady state, and the other is then introduced with intensive monitoring of pharmacokinetics and pharmacodynamic effects of each drug.

A 72-year-old man is admitted after being found by his home help in a confused state. He is usually able to care for himself, with help for cooking and cleaning, but on this occasion she found him slumped in a chair complaining of pain in his right knee, and shouting at her to get help. He has a history of gout and drinks four pints of beer per day. It is unclear whether he is compliant with medication for blood pressure.

On examination, he is pyrexial (39.1 °C), BP is 95/70 mmHg and pulse 95/min and regular. The right knee is swollen and erythematous, and he cannot flex it more than 30 degrees.

Investigations:

Hb	130 g/l
WCC	16.1×10^9/l
PLT	189×10^9/l
Na^+	138 mmol/l
K^+	4.5 mmol/l
Creatinine	132 umol/l
CRP	225 mg/l
Urate	520 umol/l
Knee joint asperate	-ve birefringent crystals, 350 neutrophils/ml

Which of the following is the most appropriate intervention?

A	Allopurinol
B	Colchicine
C	Flucloxacillin

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B	Colchicine
C	Flucloxacillin
D	Naproxen
E	Prednisolone

C Flucloxacillin

Given significant evidence of sepsis, with relative hypotension, tachycardia and marked pyrexia, antibiotic intervention is essential until blood culture results are known. The neutrophil count is outside the normal range and may represent septic arthritis. Although urate crystals are seen in the joint, it is possible for sepsis and gout to co-exist.

A Allopurinol

Even in proven acute gout, allopurinol can worsen symptoms initially and therefore should be avoided during the initial period of therapy.

B Colchicine

This is a first-line option for the treatment of gout, but given the degree of systemic symptoms, sepsis should be ruled out/treated first. It is associated with symptoms of diarrhoea, which means it be poorly tolerated in some patients.

D Naproxen

In this situation with a moderate elevation in creatinine, colchicine is potentially preferred as an anti-inflammatory.

E Prednisolone

This is an option for acute gout, but there are significant signs of sepsis and this should be the assumed initial diagnosis.

Question 15 of 178

You review a 58-year-old man with severe hypertension who has presented to the Emergency Department with intractable headache, diplopia, nausea and vomiting.

On examination, his blood pressure (BP) is 195/115 mmHg and he has papilloedema, diplopia, nausea and vomiting. You begin an infusion of labetalol but he is still hypertensive. You consider trying a sodium nitroprusside infusion.

Which of the following fits best with use of sodium nitroprusside?

- A It can be used when there is suspected coarctation of the aorta
- B It leads to relaxation of gut smooth muscle as well as vascular smooth muscle
- C It should not be used where there is B_{12} deficiency
- D Blood pressure begins to fall after 5–10 min of infusion
- E Cyanide accumulation occurs in overdose

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Your answer was incorrect

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Explanation

E Cyanide accumulation occurs in overdose

Sodium nitroprusside is a potent short-acting vasodilator, which acts via the nitric oxide pathway to increase cGMP

E Cyanide accumulation occurs in overdose

Sodium nitroprusside is a potent short-acting vasodilator, which acts via the nitric oxide pathway to increase cGMP within smooth muscle cells. Side effects include nausea, sweating, headache and twitching, and overdose may be associated with accumulation of cyanide.

B It leads to relaxation of gut smooth muscle as well as vascular smooth muscle

Although nitroprusside does lead to relaxation of vascular smooth muscle, it doesn't impact on GI smooth muscle – for example, in the duodenum.

A It can be used when there is suspected coarctation of the aorta

It should not be used in coarctation of the aorta because the marked reduction in preload could precipitate dangerous hypotension.

C It should not be used where there is B_{12} deficiency

Although historical papers recommended avoiding nitroprusside in B_{12} deficiency, there is no evidence that it significantly impacts on B_{12} levels when used at therapeutic dose.

D Blood pressure begins to fall after 5–10 min of infusion

Sodium nitroprusside has a rapid hypotensive effect that begins to appear within 30–60 s of commencing the infusion.

A 21-year-old man is brought to hospital by ambulance. The vehicle was called by his girlfriend who found him semiconscious and hyperventilating, surrounded by a number of empty packets of aspirins. Apparently, there had been a row that morning some 5 h earlier.

On examination, his blood pressure is 112/72 mmHg, pulse is 85 bpm and regular. He is hyperventilating with a respiratory rate of 27/min, with saturations of 96% on air. Abdomen is generally tender, particularly in the epigastrium.

Investigations (arterial blood gas):

Hb	13.1 g/dl
WCC	10.9×10^9/l
PLT	203×10^9/l
Na^+	142 mmol/l
K^+	3.1 mmol/l
Bicarbonate	15 mmol/l
Creatinine	132 µmol/l
pH	7.42
Salicylate	500 mg/l

Which of the following is the most appropriate next intervention?

A Haemodialysis

B Intravenous (iv) bicarbonate

C iv potassium

D iv normal saline with furosemide

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Question 16 of 178

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Which of the following is the most appropriate next intervention?

Your answer was correct

A	Haemodialysis
B	Intravenous (iv) bicarbonate
C	iv potassium
D	iv normal saline with furosemide
E	iv magnesium

Explanation

C iv potassium

This man has a compensated metabolic acidosis, commonly known as the second stage of aspirin overdose. At this stage correction of potassium should be instigated, and post correction of potassium, urinary alkalinisation considered. The first stage of aspirin overdose is a respiratory acidosis, the second stage occurring at around the 4-5-hour stage after overdose is a compensated

A	Haemodialysis

Haemodialysis should be considered primarily for patients with:

- Plasma concentrations greater than 700 mg/l (5.1 mmol/l)
- Acute kidney injury
- Congestive cardiac failure
- Non-cardiogenic pulmonary oedema
- Coma
- Convulsions
- CNS effects not resolved by correction of acidosis
- Persistently high salicylate concentrations unresponsive to urinary alkalinisation
- Severe metabolic acidosis (pH below 7.2).

B	Intravenous (iv) bicarbonate

iv bicarbonate should only be considered after serum potassium has been corrected.

D	iv normal saline with furosemide

Forced alkaline diuresis is not recommended in the management of aspirin overdose.

E	iv magnesium

Although magnesium replacement may be required, correction of potassium and initiation of bicarbonate therapy are the initial most important steps.

A 62-year-old man is found confused by his friends holding an empty medication bottle with no label. His friends say he has a background of angina, chronic bronchitis on home oxygen, and osteoarthritis. The patient starts vomiting and has a seizure, which is controlled with diazepam.

His temperature is 36.8 °C, pulse 120/min regular, blood pressure 115/86 mmHg.

Investigations:

ECG	Sinus tachycardia
Sodium	144 mmol/l
Potassium	2.9 mmol/l
Urea	5.8 mmol/l
Creatinine	75 µmol/l
Calcium	2.63 mmol/l
Glucose	9.3 mmol/l
Theophylline	290 µmol/l (55–110 µmol/l)

While in the assessment unit he continues to have further seizures and vomiting episodes with decreased consciousness, so you electively intubate and ventilate him.

What is the most appropriate intervention?

A Intravenous (iv) phenytoin

B Sodium bicarbonate

C Gastric lavage

D Charcoal haemoperfusion

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A	Intravenous (iv) phenytoin
B	Sodium bicarbonate
C	Gastric lavage
D	Charcoal haemoperfusion
E	Peritoneal dialysis

D Charcoal haemoperfusion

The patient has overdosed on theophylline medication. This can cause cardiac arrhythmias, vomiting, confusion, seizures, hypokalaemia, hyperglycaemia and hypercalcaemia. In this patient, with high theophylline serum levels and persisting seizures, charcoal haemoperfusion is a reasonable option. Blood from the patient is passed through a charcoal resin, and this will remove protein-bound toxins. Seizure activity is difficult to control in this situation and the patient may need transfer to an intensive care unit. Peritoneal dialysis is ineffective. Sodium bicarbonate has a role in the treatment of tricyclic overdose.

A Intravenous (iv) phenytoin

iv phenytoin is a potential anti-arrhythmic used in the treatment of ventricular tachycardia for patients with digoxin overdose, particularly where digibind is not immediately available.

B Sodium bicarbonate

Sodium bicarbonate is used for patients with tricyclic antidepressant overdose where there is QRS prolongation.

C Gastric lavage

Gastric lavage is rarely instituted for the treatment of overdose. Where patients present early after overdose it may be considered for iron ingestion.

E Peritoneal dialysis

Peritoneal dialysis is less effective for the treatment of

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E	Peritoneal dialysis

Peritoneal dialysis is less effective for the treatment of theophylline overdose than charcoal haemoperfusion. Haemoperfusion allows potentially more rapid theophylline removal.

A 72-year-old man, who has suffered from chronic obstructive pulmonary disease (COPD) for some years, is admitted to the Emergency Department having suffered a grand mal seizure. According to his wife, he has also been vomiting for a couple of days.

Apparently, the general practitioner (GP) had started him on an antibiotic for a respiratory tract infection. Additional medication includes a high-dose salmeterol fluticasone inhaler for his COPD, and oral theophylline.

Investigations:

Haemoglobin (Hb)	12.1 g/dl
White cell count (WCC)	8.2 × 10^9/l
Platelets (PLT)	211 × 10^9/l
Sodium (Na$^+$)	139 mmol/l
Potassium (K$^+$)	3.1 mmol/l
Creatinine (Cr)	140 µmol/l

You suspect theophylline toxicity related to a drug interaction.

Which of the following is the most likely cause?

A Amoxicillin

B Co-amoxyclav

C Rifampicin

D Ciprofloxacin

E Trimethoprim

Haemoglobin (Hb)	12.1 g/dl
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20610

D	Ciprofloxacin

Drugs known to reduce clearance of theophylline include allopurinol, cimetidine, ciprofloxacin, corticosteroids, diltiazem, erythromycin, frusemide, isoprenaline, oral contraceptives, thiabendazole and verapamil. Ciprofloxacin is an inhibitor of CYP 1A2 and this, coupled with some effect on 3A4 metabolism, may drive theophylline accumulation.

A	Amoxicillin

Penicillins do not impact on theophylline metabolism.

B	Co-amoxyclav

Clavulanic acid, like penicillins, does not impact on theophylline metabolism.

C	Rifampicin

Rifampicin is a P450 enzyme inducer, which is likely to reduce theophylline levels.

E	Trimethoprim

Case reports of hyponatraemia exist when trimethoprim and theophylline are co-administered, but theophylline toxicity itself isn't reported.

A 27-year-old woman is admitted in a comatose state. She was found lying unconscious on the floor of her apartment by her boyfriend.
She had recently been fired by her employer for below-standard behaviour at work. She was taking regular amitriptyline at night, prescribed by her GP for low mood and trouble with sleeping.

On examination, she is comatose and receiving oxygen by mask. Her pulse is 130/min and blood pressure is 110/70 mmHg. Her pupils are 8 mm and unreactive to light. The fundi are normal. Her eyes are divergent and the oculocephalic reflex is sluggish. Painful stimuli lead to decortication of the upper limbs. Tendon reflexes are brisk and plantar responses are extensor on both sides. The bladder is full and she is catheterised.

Electrocardiogram (ECG) reveals QRS widening. While she is being examined she has a generalised seizure. An urgent computed tomography (CT) of the head is normal and cerebrospinal fluid (CSF) study reveals 5 lymphocytes, 0.3 g/l protein and 5.5 mmol of glucose with a random blood glucose of 6.5 mmol/l. Blood gases were abnormal, showing metabolic acidosis.

What one of the following represents the most important intervention for her?

A Dimercaprol

B Sodium bicarbonate

C Amiodarone

D Physiostigmine

E Charcoal haemoperfusion

A 32-year-old woman, who is 32 weeks pregnant, is admitted as an emergency from the Antenatal Clinic with severe headaches, blurred vision and bilateral leg swelling.

On examination, she has a blood pressure (BP) of 180/130 mmHg. There is bilateral papilloedema, peripheral oedema, increased tone, reflexes and bilateral extensor plantars. Ultrasound reveals that the fetus is growing adequately and there is no imminent need for delivery from the point of view of fetal health.

Investigations;

Haemoglobin (Hb)	11.0 g/dl
White cell count (WCC)	5.9 × 10^9/l
Platelets (PLT)	130 × 10^9/l
Sodium (Na^+)	139 mmol/l
Potassium (K^+)	4.9 mmol/l
Creatinine (Cr)	110 μmol/l

What is the most appropriate next management step in controlling her BP?

A	Immediate delivery
B	Oral methyldopa
C	Oral ramipril
D	IV magnesium sulphate
E	IV labetalol

21499

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Creatinine (Cr)	110 µmol/l

What is the most appropriate next management step in controlling her BP?

Your answer was incorrect

A	Immediate delivery
B	Oral methyldopa
C	Oral ramipril

A 29-year-old Scandinavian woman is admitted to hospital with severe abdominal pain and vomiting. She has been investigated in the past for multiple admissions with abdominal pain, but no formal diagnosis has been reached. She suffers from constipation and occasional colicky abdominal pain.

A few days ago, the abdominal pain increased in severity and her flatmates convinced her to come to hospital when she started displaying aggressive behaviour. The patient also states she has been feeling generalised weakness in her lower limbs and she has noticed on occasion that her urine is a 'funny colour'.

Her temperature is 37.1 °C, pulse 102/min, blood pressure 142/81 mmHg.

Abdominal examination reveals generalised tenderness. She has generalised weakness of the lower limbs, with reduced reflexes. There is no visible rash on the body.

Investigations:

Hb	13.0 g/dl
WCC	12.0 × 10^9/l
PLT	310 × 10^9/l
Na^+	131 mmol/l
K^+	3.8 mmol/l
Creatinine	72 µmol/l
Urea	6.3 mmol/l
Glucose	6.9 mmol/l

What treatment will be most helpful?

A	Trimethoprim
B	Intravenous (iv) fluids

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B	Intravenous (iv) fluids
C	Insulin
D	Haematin
E	Chloroquine

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B	Intravenous (iv) fluids
C	Insulin
D	Haematin
E	Chloroquine

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Question 21 of 178

D Haematin

The scenario is pointing towards a diagnosis of acute intermittent porphyria. The biosynthetic pathway for the manufacture of haemoglobin requires globin chain synthesis and haem synthesis. Haem is produced from protoporphyrin IX and a ferrous (Fe^{2+}) ion. The porphyrias result from defects in the porphyrin biosynthetic pathway. Acute intermittent porphyria results from a defect in the enzyme porphobilinogen deaminase. Symptoms include abdominal pain, peripheral neuropathy and psychiatric symptoms. There is sometimes an association with hyponatraemia and the syndrome of inappropriate anti-diuretic hormone secretion (SIADH). The urine darkens on standing and the diagnosis can be confirmed by analysing the urinary and faecal porphyrins. Haematin can help patients as it acts as a negative feedback operator on the porphyrin synthetic pathway. As a general rule, enzyme inducers exacerbate porphyria as they induce the pathway leading to increased production of porphyrins.

Porphyrias produce skin rashes except for acute intermittent prophyria. The porphyrias are inherited as autosomal dominant conditions, except for congenital erythropoetic porphyria that is autosomal recessive.

A Trimethoprim

Although the urine is discoloured, this is more likely to be due to porphyrins than a UTI. Note in particular that the patient is apyrexial and there are no signs of urinary tract infection.

B Intravenous (iv) fluids

iv 5% dextrose may exacerbate hyponatraemia in this situation, although there is evidence that higher levels of carbohydrate replacement can abort an acute episode.

Question 21 of 178

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B Intravenous (iv) fluids

iv 5% dextrose may exacerbate hyponatraemia in this situation, although there is evidence that higher levels of carbohydrate replacement can abort an acute episode.

C Insulin

Insulin has no role in the treatment of acute porphyria; carbohydrate replacement and haematin are the key interventions.

E Chloroquine

Chloroquine is a therapy for porphyria cutanea tarda, not for acute intermittent porphyrias.

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A 27-year-old man comes to the Respiratory Clinic with active pulmonary tuberculosis. You ask him about contacts, and he mentions his girlfriend, a teacher, with whom he split up three months earlier.

She is reviewed in the clinic, looks well, is apyrexial and has no symptoms of infection. Her blood results are described below.

Investigations:

Hb	12.1 g/dl
WCC	5.7 × 10^9/l
PLT	209 × 10^9/l
Na^+	139 mmol/l
K^+	4.9 mmol/l
Creatinine	130 µmol/l
ESR	8.0 mm/hr
Quantiferon test	+
HIV test	-
Chest X-ray	Normal

Which of the following is the most appropriate way to manage her?

A Full anti-tuberculous therapy

B Rifampicin and isoniazid for three months

C Repeat chest X-ray in four weeks

D Reassure

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Quantiferon test	+
HIV test	-
Chest X-ray	Normal

Which of the following is the most appropriate way to manage her?

A	Full anti-tuberculous therapy
B	Rifampicin and isoniazid for three months
C	Repeat chest X-ray in four weeks
D	Reassure
E	Rifampicin for one month

A 19-year-old woman is being investigated for epistaxis. She has noticed increased bruising and has suffered from menorrhagia almost since her periods began.

A recent dental procedure resulted in protracted postoperative bleeding which required review in the local Emergency Department. She said that other members of the family suffer from a bleeding tendency.

Investigations reveal:

Hb	12 g/dl
WCC	7 × 10^9/l
PLT	380 × 10^9/l
Activated partial thromboplastin time	45 s (30–40 s)
Prothrombin time	12 s (11–15.5 s)
Bleeding time	10 min (3–8 min)
Factor VIII level	45 IU/dl (50–150 IU/dl)

What treatment would be considered initially if further dental procedures are required?

A	Platelet infusion
B	Cryoprecipitate
C	Mefanamic acid
D	Vitamin K
E	Desmopressin

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What treatment would be considered initially if further dental procedures are required?

Your answer was correct

A Platelet infusion

B Cryoprecipitate

C Mefanamic acid

D Vitamin K

E Desmopressin

Explanation

E Desmopressin

The patient has von Willebrand's disease (vWD). Von Willebrand's factor (vWf) is involved in stabilising factor VIII and in promoting platelet aggregation. In vWD, patients experience coagulopathy with prolonged bleeding time, prolonged activated partial thromboplastin time (APPT) and normal prothrombin time (PT). Their factor VIII assays can be low. Desmopressin, which is similar to antidiuretic hormone, can be used for treatment. As expected, a side-effect is hyponatraemia. For more serious bleeds or surgery, factor VIII concentrate can be used.

A Platelet infusion

It is not defective platelets that lead to bleeding in this case, but deficient aggregation due to a lack of factor VIII.

B Cryoprecipitate

Cryoprecipitate has a higher infectious risk than delivery of recombinant factor VIII; hence it is not a first-choice therapy in this situation.

C Mefanamic acid

Mefanamic acid is a non-steroidal anti-inflammatory drug which has a role in reducing the severity of menstrual bleeding where an underlying coagulopathy has been excluded.

D Vitamin K

Vitamin K is used to reverse the effect of warfarin therapy.

An 18-year-old man is brought by his mother for evaluation. He presents with anxiety, irritability and a persistent tremor. She is concerned that he is taking stimulants as he appears to sleep for only 1–2 h per night. These periods of hyperactivity are interspersed with periods of extreme tiredness. His teachers have mentioned a deterioration in his academic performance.

On examination, he is unkempt. His blood pressure is 150/100 mmHg and pulse is 110 bpm. He is alert and restless, and appears to be talking to someone who is not in the room. He tells you that his mother is jealous of him and is planning to kill him. His physical examination is otherwise unremarkable.

What is the most likely diagnosis?

A Depression

B Asperger's syndrome

C Amphetamine abuse

D Wilson's disease

E Opiate abuse

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Explanation

C Amphetamine abuse

These clinical features raise the possibility that the patient

C Amphetamine abuse

These clinical features raise the possibility that the patient is consuming central nervous system (CNS) stimulants which have significant hypertensive effects and are analeptics (eg amphetamine or methylphenidate). However, amphetamine is more likely in this patient as the latter drug does not lead to features of psychosis with prolonged use. When amphetamine is consumed chronically in high doses, it could lead to a state that is indistinguishable from paranoid schizophrenia. These drugs are capable of causing vasculitis and intracerebral or subarachnoid haemorrhages because of significant hypertension. Similar vascular complications could also be caused by over-the-counter 'cold medications' like ephedrine and phenylpropanolamine.

Withdrawal of the drug after sustained use can lead to a period of prolonged sleep, muscle pain, profound fatigue and depression.

Treatment includes discontinuation of amphetamine and administering anxiolytics and/or atypical antipsychotics if required.

A Depression

Depression would not fit with the features of sympathetic activation seen here.

B Asperger's syndrome

Asperger's syndrome is more likely to present with social withdrawal, and would not be associated with either the sympathetic activation or the features of psychosis present here.

D Wilson's disease

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A Depression

Depression would not fit with the features of sympathetic activation seen here.

B Asperger's syndrome

Asperger's syndrome is more likely to present with social withdrawal, and would not be associated with either the sympathetic activation or the features of psychosis present here.

D Wilson's disease

Wilson's disease presents more commonly with asymmetrical cerebellar signs and is not associated with the sympathetic activation and acute psychosis seen here.

E Opiate abuse

Opiate abuse is more likely to present with listlessness and inactivity, rather than the hypertension and hyperactivity seen here.

You are called to see a 38-year-old man in the Emergency Department. He was brought there by ambulance after his friend administered him a tablet that would apparently make him feel better after a heavy night out and a recent cold.

On examination, he looks very unwell. His blood pressure (BP) is 70/40 mmHg with a pulse of 104/min. He is cold and sweaty. He is stridorous and has marked wheeze on auscultation of the chest. There is an urticaria type skin rash in addition. The emergency staff have already started a 500 ml bag of normal saline.

How best would you initially manage him?

A	Glucagon IV
B	Further normal saline 1l IV stat
C	Hydrocortisone IV
D	Chlorpheniramine IV
E	Adrenalin IM

C	Hydrocortisone IV
D	Chlorpheniramine IV
E	Adrenalin IM

Explanation

E	Adrenalin IM

Despite initial fluid resuscitation, this patient still has marked hypotension and tachycardia. He is in urgent need of circulatory support. The most likely diagnosis is anaphylaxis related to the unknown medication. Night nurse, a night time cold remedy contains dextromethorphan, to which anaphylactic reactions have been described. Treatment of choice in this situation is IM adrenalin (0.3-0.5 ml of 1:1000), which may be repeated every 15 min.

A	Glucagon IV

Glucagon is of most potential use in beta-blocker overdose, and the tachycardia here is less suggestive of beta-blockade as the driver for his presentation.

B	Further normal saline 1l IV stat

Although he may respond to further fluid loading, the imminent need is to improve blood pressure and stave off potential respiratory arrest; as such, adrenalin is the most important intervention.

C	Hydrocortisone IV

Although hydrocortisone will positively impact on the

E Adrenalin IM

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Although he may respond to further fluid loading, the imminent need is to improve blood pressure and stave off potential respiratory arrest; as such, adrenalin is the most important intervention.

C Hydrocortisone IV

Although hydrocortisone will positively impact on the inflammatory cascade, at this stage it is adrenalin that is the crucial next step (hydrocortisone can be given later).

D Chlorpheniramine IV

Although this will impact on histamine-driven inflammation, the impact would be delayed with respect to blood pressure and stridor versus giving adrenalin IM.

A 17-year-old girl presents to Accident and Emergency (A&E) complaining of nausea and admits to having taken an overdose of paracetamol about 4 h earlier. She denies having taken any other tablets, and denies alcohol use. Her only past medical history of note is epilepsy, for which she takes carbamazepine.

The overdose was a spur of the moment act, which the patient now regrets. She attributes the overdose to an argument with her boyfriend. She denies any suicidal ideation or intent. She is accompanied by her mother, who is happy to take her home.

On examination, she is alert and orientated. Pulse is 70 bpm, regular. Heart sounds are normal and her chest is clear. Her abdomen is soft and non-tender, with no organomegaly and normal bowel sounds. Neurological examination is unremarkable.

Observations:

Temperature	36.4 °C
Heart rate	70 bpm
Blood pressure	124/78 mmHg
BM	5.4 mmol/l
O_2 sats	98% air
ECG	Normal sinus rhythm 60 bpm

Her blood results are as follows:

WBC	5.2 × 10^9/l
Na^+	138 mmol/l
Bilirubin	14 µmol/l
HB	13.2 g/dl
K^+	4.1 mmol/l

MCV	88 fl
Urea	5.6 mmol/l
ALK-P	63 IU/l
Platelets	216 × 10^9/l
Creatinine	108 μmol/l
Albumin	39 g/l
INR	1.1
Glucose	5.2 mmol/l
APTT	38 s
4-h paracetamol level	140 mg/l
Salicylates	< 10

What is the most appropriate next step in your management?

A	Discharge patient home and arrange outpatient psychiatric follow up
B	Admit the patient for observation, repeat blood tests and paracetamol level in 4 hours
C	Carry out gastric lavage
D	Start *N*-acetylcysteine
E	Arrange psychiatric review

7603

D Start *N*-acetylcysteine

The 4-hour paracetamol level is above the level required for starting treatment with *N*-acetylcysteine and given this patient is taking long-term carbamazepine, a potent CYP450 enzyme inducer, it is prudent to start treatment as soon as possible because her risk of significant toxicity is further increased.

B Admit the patient for observation, repeat blood tests and paracetamol level in 4 hours

This 4-hour time window extension potentially misses the important time period where intervention may prevent or at least significantly reduce liver damage.

A Discharge patient home and arrange outpatient psychiatric follow up

Given this patient's paracetamol level they are at significant risk of hepatotoxicity.

C Carry out gastric lavage

Gastric lavage has only a very limited role in the treatment of overdoses, for example in the first few minutes after overdose of agents such as tricyclic antidepressants.

E Arrange psychiatric review

Although inpatient psychiatric review may be required, treatment for potential hepatotoxicity is the more urgent intervention.

A 40-year-old man visits an Infertility Clinic on account of inability to sustain an erection. He does have an early morning erection, but when he tries to penetrate his partner, the erection is either too short-lived or too soft to achieve adequate penetration. He has suffered from type 1 diabetes for 30 years.

On examination, his blood pressure (BP) is 155/90 mmHg. He has a normal distribution of pubic and axillary hair, and a normal penis and testes on examination.

Investigations:

Hb	13.1 g/dl
WCC	5.9 × 10^9/l
PLT	201 × 10^9/l
Na^+	139 mmol/l
K^+	4.9 mmol/l
Creatinine	110 μmol/l
Total chol	5.2 mmol/l
TG	2.1 mmol/l
HbA1c	57.38 mmol/mol (7.4%)

Which of the following is the most appropriate treatment for him?

A Sildenafil

B Transdermal testosterone

C Psychosexual counselling

D Additional blood glucose lowering therapy

A Sildenafil

Given the duration of this patient's diabetes, the most likely cause of his erectile dysfunction is microvascular disease. As such, moving to oral therapy to improve penile blood flow is an appropriate intervention. In diabetes, high doses of PDE5 inhibitors such as sildenafil may be needed to achieve a therapeutic effect.

C Psychosexual counselling

Although counselling has an important role in managing sexual dysfunction, he is also appropriate for medical intervention.

B Transdermal testosterone

Given this man is 40 and has morning erections and normal penis, testes and sexual hair, he is unlikely to be significantly testosterone deficient. Of course it is appropriate to assess testosterone levels as part of the work-up for him, but given it's likely these are in the normal range, an impact on sexual function wouldn't be expected.

D Additional blood glucose lowering therapy

Although tight glycaemic control can stay progression of microvascular disease, reversal of existing damage isn't seen.

E Referral for penile implant

This is obviously an intervention of last resort in patients who fail to respond to PDE5 inhibitors and prostaglandin-based therapies.

A 29-year-old woman presents to her general practitioner (GP) complaining of tiredness, lethargy, headaches and tremor. She received a renal transplant one year earlier and takes a ciclosporin-based immunosuppression regime.

One week prior to her visit to the GP she had been started on a prolonged course of fluconazole by a locum doctor in an attempt to clear up a long-standing fungal infection.

Investigations:

Haemoglobin (Hb)	9.2 g/dl
White cell count (WCC)	2.3 × 10^9/l
Platelet (PLT)	79 × 10^9/l
Sodium (Na^+)	139 mmol/l
Potassium (K^+)	4.5 mmol/l
Creatinine (Cr)	230 μmol/l

You suspect a probable drug interaction.

Which of the following is the most likely cause of her problems?

A	Decreased fluconazole excretion
B	Decreased ciclosporin excretion
C	CYP450 induction leading to increased ciclosporin metabolism
D	CYP450 inhibition leading to decreased ciclosporin metabolism
E	Increased formation of 6-mercaptopurine

Question 28 of 178

D CYP450 inhibition leading to decreased ciclosporin metabolism

Fluconazole is a CYP-P450 enzyme inhibitor, leading to an elevation of 50% or more in levels of ciclosporin, which is specifically metabolised by CYP-3A4. If fluconazole treatment is required, then a temporary reduction in ciclosporin dose is usually advised, the peak in levels occurring from around day 4 of fluconazole treatment onwards. Symptoms of ciclosporin toxicity include tremor and headache, nausea, vomiting and abdominal pain. Raised creatinine, anaemia and thrombocytopenia are also seen. In this situation, ciclosporin levels are a crucial part of the work-up in diagnosing the underlying cause of any elevation in creatinine.

A Decreased fluconazole excretion

Approximately 80% of fluconazole is excreted unchanged in the urine; it isn't directly nephrotoxic and this isn't therefore the cause of the clinical picture seen here.

B Decreased ciclosporin excretion

Only 6% of the oral dose of ciclosporin is excreted unchanged in the urine. It is extensively metabolised by the P450 system in the liver, meaning that the cause of ciclosporin toxicity is decreased biotransformation rather than decreased excretion.

C CYP450 induction leading to increased ciclosporin metabolism

Fluconazole is an enzyme inhibitor, not an inducer of the P450 system.

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C CYP450 induction leading to increased ciclosporin metabolism

Fluconazole is an enzyme inhibitor, not an inducer of the P450 system.

E Increased formation of 6-mercaptopurine

6-mercaptopurine is a metabolite of azathioprine responsible for azathioprine toxicity when it accumulates to excess; it isn't connected with ciclosporin metabolism.

A 45-year-old civil engineer is brought to the Emergency Department with a decreased level of consciousness and slurred speech. His past medical history includes a diagnosis of bipolar affective disorder, which has remained quiescent of late due to his regular medications.

Two weeks previously, he had developed a painful left knee, and had taken ibuprofen regularly since. His blood pressure is 122/82, pulse is 85 and regular. His Glasgow Coma Scale (GCS) score is 13. Bloods on admission reveal an elevated sodium of 148 mmol/l, creatinine of 152 µmol/l and a lithium level of 4.8.

Which of the following is the most appropriate intervention?

A Multiple-dose activated charcoal

B Forced alkaline diuresis

C Haemodialysis

D Flumazenil

E Sodium bicarbonate

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Which of the following is the most appropriate intervention?

Your answer was correct

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C	Haemodialysis
D	Flumazenil
E	Sodium bicarbonate

Explanation

C Haemodialysis

Lithium (usually given in the carbonate form) is prescribed for the prophylaxis and treatment of mania, bipolar

C Haemodialysis

Lithium (usually given in the carbonate form) is prescribed for the prophylaxis and treatment of mania, bipolar affective disorder and occasionally unipolar depression. It has a narrow therapeutic ratio, and therefore careful therapeutic drug monitoring is mandatory. Toxicity may be precipitated by sodium depletion, and therefore diuretics should be avoided. Non-steroidal anti-inflammatory drugs (NSAIDs) impair the renal excretion of lithium, also leading to potential toxicity. In this case, with a lithium level of 4.8, potentially severe toxicity is indicated. The treatment is therefore haemodialysis, which may be repeated as blood levels of lithium can re-bound due to widespread tissue distribution.

A Multiple-dose activated charcoal

There is no evidence that activated charcoal is effective at adsorbing lithium. Gastric lavage may be considered within the first hour of a potential overdose.

B Forced alkaline diuresis

This was formerly indicated in aspirin overdose, although it's now not used because of the risk of exacerbating pulmonary oedema.

D Flumazenil

Flumazenil is used as a reversal agent for patients with acute benzodiazepine overdose associated with short-term use.

E Sodium bicarbonate

Sodium bicarbonate is indicated for the treatment of

A 58-year-old man currently receiving warfarin therapy for a deep vein thrombosis (DVT) presents for review. He has a past medical history of chronic obstructive pulmonary disease (COPD) and an inferior myocardial infarction some four years earlier. There is also a history of multiple previous urinary tract infection (UTI). He is concerned about how co-medications and eating could impact on his international normalised ratio (INR).

Which of the following does he need to be most concerned about while taking warfarin with respect to increased INR?

A Cranberry juice

B Grapefruit juice

C Prednisolone

D Amoxicillin

E Amitriptyline

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A Cranberry juice

It is p450 inhibitors that cause most concern when co-prescribed with warfarin, and cranberry juice is specifically recognised to inhibit CYP2C9, which is the main route for warfarin metabolism.

B Grapefruit juice

Grapefruit juice is an inhibitor of CYP3A4, and as such the major interactions for grapefruit juice are with agents such as simvastatin and ciclosporin.

C Prednisolone

Prednisolone is a hepatic enzyme inducer, and is likely therefore to reduce rather than increase INR.

D Amoxicillin

With respect to warfarin and antibiotics, ciprofloxacin and clarithromycin carry the most significant interaction risk because of P450 inhibition, although other antibiotics may also have more minor effects on INR because of modification of gut flora.

E Amitriptyline

This is recognised to have only minor effects on INR.

A 34-year-old woman has been admitted from clinic with severe rheumatoid arthritis (RA). She has symptoms of persistent synovitis, despite taking high-dose weekly methotrexate, non-steroidal anti-inflammatories and low-dose prednisolone. The consultant has discussed pros and cons of starting biological therapy.

What of the following criteria would rule out infliximab as an option for this patient?

A	Coexistent psoriasis
B	Coexistent multiple sclerosis
C	Asthma
D	Gout
E	Glaucoma

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C	Asthma
D	Gout
E	Glaucoma

Explanation

B	Coexistent multiple sclerosis

Evidence from intervention trials with anti-TNF agents in inflammatory bowel disease and arthritis have suggested increased risk of new demyelinating diseases in patients prescribed them. The mechanism as to why this happens is unclear, as it is not consistently reflected in animal models of multiple sclerosis.

Other contraindications for anti-TNF agents include:

B Coexistent multiple sclerosis

Evidence from intervention trials with anti-TNF agents in inflammatory bowel disease and arthritis have suggested increased risk of new demyelinating diseases in patients prescribed them. The mechanism as to why this happens is unclear, as it is not consistently reflected in animal models of multiple sclerosis.

Other contraindications for anti-TNF agents include:

- Active infection
- Pregnancy
- Breastfeeding
- New York Heart Association grade 3–4 heart failure
- Active tuberculosis (patients should also be screened for previous infection before starting therapy).

A Coexistent psoriasis

Psoriasis is a target disease for treatment with anti-TNF agents and data show a consistent improvement in symptoms associated with therapy.

C Asthma

Although TNF is not a target for patients suffering from asthma, anti-TNF agents do not worsen symptoms of asthma.

D Gout

Anti-inflammatory agents may impact on the acute phase of gout, although anti-IL1-based agents probably have the greatest positive effect rather than anti-TNF.

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D Gout

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E Glaucoma

Anti-TNF agents have no negative effect on intra-ocular pressure or symptoms of glaucoma.

Question 32 of 178

You review a 72-year-old woman with urinary tract infection (UTI). Microscopy, culture and sensitivity demonstrate *E. coli* sensitive to ciprofloxacin.

Which of the following correctly describes the mode of action of ciprofloxacin?

A It is an inhibitor of folate synthesis

B It is an inhibitor of bacterial cell wall synthesis

C It interferes with the functioning of bacterial ribosomes

D It is an inhibitor of DNA gyrase

E It is an inhibitor of DNA polymerase

6489

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Question 32 of 178

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D	It is an inhibitor of DNA gyrase
E	It is an inhibitor of DNA polymerase

Explanation

D It is an inhibitor of DNA gyrase

The quinolones, of which ciprofloxacin is a member, are inhibitors of bacterial DNA gyrase. Gyrase drives super-coiling of the circular double-stranded DNA found in bacteria.

A It is an inhibitor of folate synthesis

Inhibitors of bacterial folate synthesis include

D It is an inhibitor of DNA gyrase

The quinolones, of which ciprofloxacin is a member, are inhibitors of bacterial DNA gyrase. Gyrase drives super-coiling of the circular double-stranded DNA found in bacteria.

A It is an inhibitor of folate synthesis

Inhibitors of bacterial folate synthesis include sulphonamides and trimethoprim. Patients taking bacterial folate inhibitors rarely become folate deficient, although use of trimethoprim in early pregnancy is not recommended.

B It is an inhibitor of bacterial cell wall synthesis

Inhibitors of bacterial cell wall synthesis include penicillins, cephalosporins and vancomycin.

C It interferes with the functioning of bacterial ribosomes

Inhibitors of bacterial ribosome function include aminoglycosides, erythromycin and tetracyclines. Tetracyclines are bacteriostatic and hence may actually reduce the effectiveness of bactericidal antibiotics such as penicillins when used in combination.

E It is an inhibitor of DNA polymerase

Nalidixic acid is an example of an inhibitor of bacterial DNA polymerase.

A 76-year-old woman with known vascular dementia is sent in to A&E by nursing home staff with a 2-day history of fever, reduced mobility and drowsiness. Four days earlier she was seen by the on-call GP as she had been agitated and hallucinating. He started her on haloperidol for this.

In A&E her temperature is 39.4 °C. She is drowsy with a Glasgow Coma Scale (GCS) 12/15 (E3 V4 M5). She has a sinus tachycardia of 116 bpm. Blood pressure is 112/56 mmHg and heart sounds are normal. Her chest is clear and her abdomen is soft and non-tender, with normal bowel sounds. Neurological examination reveals generalised hypertonia, but normal power and reflexes.

Investigations are as follows:

WBC	8.1 ×10^9/l
Hb	12.4 g/dl
MCV	82.4 fl
PLT	224 ×10^9/l
Na$^+$	136 mmol/l
K$^+$	5.4 mmol/l
Urea	9.6 mmol/l
Creatinine	167 μmol/l
Bilirubin	14 μmol/l
Aalanine aminotransferase (ALT)	35 U/l
Alkaline phosphatase	124 U/l
Albumin	38 g/l
ECG	Sinus tachycardia
Chest X-ray	Normal cardiac silhouette, no

Rana Alnasser's screen

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ECG	Sinus tachycardia
Chest X-ray	Normal cardiac silhouette, no focal consolidation

What of the following treatments is most important?

A	Give IV antibiotics
B	Give SC bromocriptine
C	Give IV phenytoin
D	Give IV naloxone
E	Give IV flumazenil

B Give SC bromocriptine

This patient has neuroleptic malignant syndrome precipitated by the administration of haloperidol. Clinical features of neuroleptic malignant syndrome include:

- Muscular rigidity (sometimes with dysphagia and dysarthria)
- Extrapyramidal signs, tremor
- Catatonia/muteness
- Increased serum creatinine phosphokinase (CPK)/aspartate aminotransferase (AST)
- Pyrexia .

Other causative agents include phenothiazines, loxapine, thioxanthenes, metoclopramide and tetrabenazine. The syndrome can occur within hours of initiating drug therapy, but typically takes about 1 week. Complications include rhabdomyolysis, renal and hepatic failure, cardiovascular collapse, disseminated intravascular coagulation (DIC), and respiratory failure. Mortality is ~10%.

Treatment involves withdrawal of the causative agent, IV fluids, cooling measures and bromocriptine. Whilst dantrolene sodium was formerly recommended as monotherapy, case series suggest that when it is used in the absence of bromocriptine, mortality may actually be increased.

A Give IV antibiotics

The proximity to prescription of haloperidol and the normal white blood cell count are stronger pointers towards neuroleptic malignant syndrome rather than an acute infection.

C Give IV phenytoin

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A	Give IV antibiotics

The proximity to prescription of haloperidol and the normal white blood cell count are stronger pointers towards neuroleptic malignant syndrome rather than an acute infection.

C	Give IV phenytoin

The decreased consciousness and confusion seen here is unlikely to represent epilepsy in the absence of other features to suggest seizure activity.

D	Give IV naloxone

Naloxone is utilised as the reversal agent for opiate overdose.

E	Give IV flumazenil

IV flumazenil is used as a reversal agent for acute benzodiazepine overdose.

Question 34 of 178

A 32-year-old arable farmer is brought to A&E one evening having become increasingly confused over the previous 5 h. He had been feeling well at breakfast time before going out to work in the fields, but staggered into the house in the late afternoon complaining of nausea and vomiting, and feeling generally weak. He now has profuse diarrhoea with associated abdominal cramps.

On examination, he is diaphoretic and salivating profusely. He is disorientated regarding time, place and person. His pupils are equal and constricted. His temperature is 36.9 °C. His heart rate is 54 bpm, regular, jugular venous pressure (JVP) is not seen and blood pressure (BP) is 102/54 mmHg. Heart sounds are normal.

Respiratory examination reveals bilateral expiratory wheeze, but no crepitations. His oxygen saturations are 92% on air. His abdomen is soft and diffusely tender, but there is no guarding or rebound tenderness. Bowel sounds are present. Power is globally reduced in all four limbs (grade 4/5), with slightly depressed reflexes, but plantar response is flexor. A few fasciculations are noted in his legs. His coordination and sensation are unimpaired.

What is the likely diagnosis?

A Botulism
B Guillain-Barré syndrome
C Organophosphate poisoning
D Tetanus
E Belladonna poisoning

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C Organophosphate poisoning

Organophosphate insecticides inhibit the enzyme acetylcholinesterase, allowing accumulation of excessive acetylcholine (ACh) at muscarinic and nicotinic receptors, and in the CNS. Signs and symptoms of acute organophosphate poisoning may occur within 1-2 h of exposure, but may also be delayed, especially after skin exposure. Sudden deterioration can occur in a patient with few initial symptoms.

Clinical manifestations may be classified into muscarinic, nicotinic and CNS effects, as follows:

Muscarinic: vomiting, diarrhoea, abdominal cramping, bronchospasm, miosis, bradycardia, excessive salivation and sweating. Severe diaphoresis can lead to dehydration with systemic hypovolaemia, resulting in shock.

Nicotinic: muscle fasciculations, tremor and weakness. Death is usually caused by respiratory muscle paralysis.

BP and pulse may be decreased due to muscarinic effects, or increased due to nicotinic effects.

CNS poisoning: agitation, seizures, coma.

Treatment is with supportive measures, which may include intubation and ventilation. Decontamination of skin and clothes, and reduction of enteral absorption with activated charcoal may be indicated. Intravenous (iv) atropine may reverse the muscarinic effects but not the nicotinic effects. Pralidoxime is a specific antidote that acts to regenerate the enzyme activity at all affected sites.

A Botulism

Botulism begins with CNS symptoms including blurred vision, difficulty in speaking and swallowing. Diarrhoea and

Pralidoxime is a specific antidote that acts to regenerate the enzyme activity at all affected sites.

A	Botulism

Botulism begins with CNS symptoms including blurred vision, difficulty in speaking and swallowing. Diarrhoea an vomiting may be seen but are not necessarily a prominent feature, and there is a descending flaccid paralysis.

B	Guillain-Barré syndrome

Guillain-Barré presents with gradually progressive ascending weakness, rather than the rapid onset of both CNS and PNS symptoms over a number of hours.

D	Tetanus

Tetanus is associated with a pattern of descending upper motor neurone weakness, rather than the lower motor neurone symptoms seen here, accompanied by signs and symptoms of autonomic nervous system dysfunction.

E	Belladonna poisoning

Some symptoms of belladonna poisoning may overlap here, including sweating, tachycardia and blurred vision, although other symptoms such as constipation are not features of the presentation as reported here.

A 28-year-old woman is admitted to the surgical unit with an acute abdomen and a provisional diagnosis of appendicitis. During induction of anaesthesia, she had some stiffness of the jaw muscles. However, she later relaxed and surgery was commenced.

Within a few minutes, however, the stiffness of jaw had increased significantly and her limbs also became stiff. Th surgical procedure had to be abandoned. Her body temperature rose to 42 °C. Her pulse was 120/min and thread, and blood pressure fell to 80/50 mmHg. Arterial blood gases revealed pCO_2 of 8.0 kPa, pH 7.1 and HCO_3^- 28mmol/l.

What is the most likely diagnosis?

A Serotonin syndrome
B Tonic status epilepticus
C Acute dystonic reaction
D Malignant hyperthermia
E Tardive dyskinesia

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A	Serotonin syndrome
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Explanation

D Malignant hyperthermia

This is a dramatic situation observed during general anaesthesia in individuals who are susceptible. The patien develops progressively increasing muscular rigidity rather than muscular relaxation, as inhaled anaesthetics or succinylcholine are introduced. Although halothane was

D	Malignant hyperthermia

This is a dramatic situation observed during general anaesthesia in individuals who are susceptible. The patient develops progressively increasing muscular rigidity rather than muscular relaxation, as inhaled anaesthetics or succinylcholine are introduced. Although halothane was identified originally as a cause of malignant hyperthermia, it is also reported with more modern anaesthetics such as isoflurane. Temperature rises steadily up to 42–43 °C. Respiratory and heart rates escalate. Arterial $paCO_2$ increases and creatinine phosphokinase rises to extraordinary levels and spills into the urine. Circulatory collapse and death occur in 10% of patients.
Other members of the family may have collapsed or died during anaesthesia,and hence a family history gives a clue Some susceptible patients have musculoskeletal features such as stature, ptosis, strabismus, high arched palate or dislocated patellae; kyphoscoliosis has also been seen in some families (King-Denborough syndrome). Certain congenital myopathies also predispose to malignant hyperthermia. Treatment is to immediately switch from volatile anaesthetics at the first hint of masseter spasm or rise of body temperature to alternative agents such as propofol. Intravenous dantrolene can be given as a bolus, and the patient should be cooled and hydrated; acidosis should be corrected.

A	Serotonin syndrome

Serotonin syndrome is associated with agitation, muscular rigidity and hyper-reflexia, but occurs in patients prescribed an SSRI.

B	Tonic status epilepticus

Given that anaesthesia is the intervention of choice for epilepsy resistant to conventional agents, tonic status is

A 72-year-old man is admitted via ambulance. You attend as part of the crash team when initial observations reveal that he has a pulse rate of 35 bpm and blood pressure of 82/40 mmHg. He is in cardiac failure.

On initial survey, members of the casualty staff have discovered a note explaining that he has taken an overdos after the recent death of his wife. One of the nurses calls the GP and it transpires he is on a range of blood pressure medications. You give him 1 mg of atropine IV.

Which of the following interventions would be the next most appropriate step in his management?

A IV glucagon administration

B IV dopamine administration

C IV adrenaline administration

D Cardiac pacing

E IV salbutamol administration

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Explanation

A IV glucagon administration

Key initial measures for this patient include establishment of IV access, electrocardiogram (ECG) and blood pressure recording. Apart from that, IV glucagon administration exerts an inotropic effect independent of β-receptor

Explanation

A IV glucagon administration

Key initial measures for this patient include establishment of IV access, electrocardiogram (ECG) and blood pressure recording. Apart from that, IV glucagon administration exerts an inotropic effect independent of β-receptor activation by raising myocardial cAMP levels: 50–150 μg/k is usually given as a bolus, followed by infusion at 1–5 mg/h. If hypoglycaemia develops in response to possible blocker overdose, then 25 ml of 50% dextrose followed by dextrose infusion is recommended in addition to IV glucagon.

B IV dopamine administration

Dopamine is most commonly used as an inotrope to preserve renal perfusion rather than to increase heart rate in β-blocker overdose.

C IV adrenaline administration

IV adrenaline is not recommended because of the risk of precipitating a ventricular arrhythmia.

D Cardiac pacing

This is the option in the event that enough glucagon to deliver repeated high doses is not available.

E IV salbutamol administration

IV salbutamol is of most use where there is bronchospasm associated with β-blocker overdose.

A 26-year-old patient is admitted drowsy and confused. History from her friends reveals a past history of depression and previous suicide attempts. She was found with an empty bottle of phenobarbital, which she apparently obtained on the internet.

Examination reveals slurred speech, ataxia and nystagmus

What therapy will best aid elimination of phenobarbital?

A Sodium bicarbonate

B Ammonium chloride

C Succinylated gelatine

D Dicobalt edetate

E Mannitol

7053

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Explanation

A	Sodium bicarbonate

The barbiturates have largely been replaced by the benzodiazepines, but they are still used for induction anaesthesia and for patients with epilepsy resistant to conventional therapies. Barbiturate overdose causes drowsiness, respiratory depression, impaired coordination and coma. They are inducers of hepatic enzymes. As a dru they are acidic, and elimination through the kidneys is aided by forced alkaline diuresis with sodium bicarbonate. Other treatments include charcoal and haemodialysis. Forced alkaline diuresis is not routinely recommended.

C	Succinylated gelatine

Succinylated gelatine is used as a volume expander for patients with acute blood loss, and doesn't therefore have a key role here.

B	Ammonium chloride

Forced acid diuresis with ammonium chloride can be helpful in amphetamine poisoning. It is not useful here.

D	Dicobalt edetate

Dicobalt edetate has a role in the treatment of cyanide poisoning. It forms stable complexes with cyanide and therefore can significantly impact on symptoms of poisoning.

E	Mannitol

Mannitol has a role in the treatment of cerebral oedema related to ciguatera poisoning (which can occur in relation

A 19-year-old woman presents with an infected human bit on her left arm. She says that she was involved in a fight three days ago while drunk.

On examination, there is a bite affecting the left upper ar which is discharging pus, and there is a 3 cm radius of erythema around the wound. She is pyrexial (37.8 °C).

Investigations:

Haemoglobin (Hb)	12.1 g/dl
White cell count (WCC)	13.1 × 10^9/l
Platelets (PLT)	201 × 10^9/l
Sodium (Na^+)	140 mmol/l
Potassium (K^+)	4.9 mmol/l
Creatinine (Cr)	110 µmol/l

Which of the following is the most appropriate choice for antibiotic therapy?

A	Amoxicillin
B	Pencillin V
C	Co-amoxiclav
D	Oxytetracycline
E	Metronidazole

Explanation

C **Co-amoxiclav**

Co-amoxiclav is the antibiotic therapy of choice for human bite wounds. It is crucial that beta-lactamase-producing Staphylococci are covered, and clavulanic acid makes sure of this. A standard course is the 625 mg TDS dose for a period of 5-7 days. It is also crucially important to make sure that the patient is covered for tetanus infection. Commonly isolated organisms include *Streptococcus*, *Staphylococcus*, *Haemophilus*, *Bacteroides* and *Eikenella corrodens*.

A Amoxicillin

Amoxicillin fails to cover against beta-lactamase-producin organisms and therefore cannot be used here.

B Pencillin V

Penicillin V only covers a limited range of mouth commensals, and doesn't have activity against a range of anaerobes that may cause significant wound infection.

D Oxytetracycline

Tetracyclines may be used as a treatment for human bites but only in combination with metronidazole.

E Metronidazole

Metronidazole alone does not provide adequate coverage and should be used in combination with either a tetracycline or clarithromycin

A 27-year-old teacher is brought to the Emergency Department having suffered a tonic-clonic seizure, which was abated with 10 mg of intravenous (iv) diazepam en route in the ambulance. She had been discovered by her boyfriend, who had found an empty tablet container next to her convulsing body. He knows that she has recently been attending the general practitioner (GP) for management of very painful, heavy periods. He has not thought to bring it with him, but thinks that it had been fu earlier that morning.

On examination, her blood pressure (BP) is 122/82 mmHg, with pulse 84/min and regular. Pupils are equal and reactive to light. Her respiratory rate is 18/min.

What is she most likely to have taken?

A	Paracetamol
B	Dihydrocodeine
C	Co-amoxiclav
D	Mefenamic acid
E	Amitriptyline

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B Dihydrocodeine

C Co-amoxiclav

D Mefenamic acid

E Amitriptyline

Explanation

D Mefenamic acid

Mefenamic acid (Ponstan™) is often prescribed in general practice for relief of pain and bleeding associated with menstruation. It has a relatively narrow therapeutic window, and overdoses have led to significant neurologica impairment when as little as 3 g is exceeded. These symptoms include drowsiness, headaches, seizures and, ir some cases, coma. Activated charcoal, when used early, is potentially of benefit

Explanation

D Mefenamic acid

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A Paracetamol

Paracetamol is associated with a late deterioration in cognitive function related to hepatorenal syndrome (HRS early neurological deterioration including seizures would not be expected.

B Dihydrocodeine

Dihydrocodeine is associated with decreased consciousness and respiratory depression rather than seizures. Naloxone is the main reversal agent.

C Co-amoxiclav

Penicillins are relatively safe in overdose, and risks of overdose are not significantly increased by the presence o clavulanic acid.

E Amitriptyline

Amitriptyline is associated with seizures in overdose, although there is no suggestion as to how this patient would have gained access to the anti-depressant.

A 34-year-old man is admitted to the Emergency Department after being found by his estranged wife having drunk a quantity of paraquat and ingested an unknown quantity of codeine phosphate tablets. It is thought that he took the overdose some 3 h previously.

On examination in the department, his blood pressure (BP) is 112/74 mmHg, pulse is 74/min and regular and he is drowsy due to having taken the codeine phosphate tablets.

Which one of the following is an important step in the management of paraquat overdose?

A 15 ml/kg of Fuller's Earth

B Dexamethasone IV

C Cyclophosphamide IV

D Oral- activated charcoal

E N-Aacetylcysteine IV

32817

A | 15 ml/kg of Fuller's Earth

Fuller's earth is the preferred absorptive substance to be administered post-paraquat ingestion, at a dose of 15 ml/kg; if it is not available, then 2 g/kg of charcoal is an alternative. Plasma levels of paraquat >0.1 mg/l at 24 h are associated with a poor prognosis; ingestion of >10 g is associated with a mortality of 100%. Death has been associated with as little as 3 g of ingested paraquat. The cause of death is usually progressive pulmonary fibrosis, which begins during the second week after ingestion. Often the oliguric kidney disease seen with paraquat, which develops within 12 h of ingestion, is beginning to resolve at this stage.

B | Dexamethasone IV

Modest benefits only were seen for dexamethasone IV in a retrospective case series analysis. It may be more useful when combined with haemoperfusion.

C | Cyclophosphamide IV

There is no evidence to support the use of cyclophosphamide in paraquat poisoning. It is of course used as an induction immunosuppressive agent across a range of inflammatory conditions.

D | Oral- activated charcoal

2 g/kg of activated charcoal is an alternative to Fuller's earth if this is unavailable.

E | N-Aacetylcysteine IV

Although N-acetylcysteine has a role as an anti-oxidant

fuller earth

Fuller's earth

Pharmaceutical

Fuller's earth is any clay material that has the capability to decolorize oil or other liquids with
treatment. Fuller's earth typically consists of palygorskite or bentonite. Modern uses of fuller
absorbents for oil, grease, and animal waste and as a carrier for pesticides and fertilizers. W

PEOPLE ALSO SEARCH FOR

PEOPLE ALSO ASK

What is fuller's earth powder used for?

Can fuller earth be used daily?

Is bentonite clay the same as Fullers Earth?

A 68-year-old man is seen in clinic because of increasing orthopnoea and exertional dyspnoea. He has a past medical history of atrial fibrillation, diabetes, hypertension and congestive cardiac failure. He tells you that his heart failure is so severe that he is barely able to climb one flight of stairs to bed.

On examination, he is noted to have gynaecomastia. His blood pressure is 115/72 mmHg, pulse is 72 bpm, atrial fibrillation, and there are bibasal crackles on auscultation of the chest and mild ankle swelling.

Investigations:

Hb	12.3 g/dl
WCC	8.1 × 10^9/l
PLT	192 × 10^9/l
Na^+	135 mmol/l
K^+	5.3 mmol/l
Creatinine	42 µmol/l

Which one of his current medications is most likely to be implicated in causing the gynaecomastia?

A Furosemide

B Ramipril

C Carvedilol

D Spironolactone

E Simvastatin

A Furosemide

B Ramipril

C Carvedilol

D Spironolactone

E Simvastatin

Explanation

D Spironolactone

Spironolactone is well recognised as a cause of gynaecomastia. This is likely to be due to its action as an anti-androgen. This property is not shared by eplerenone, and in patients suffering from troublesome gynaecomastia, medication switching can resolve the problem.

A Furosemide

Loop diuretics are not associated with increased risk of gynaecomastia.

B Ramipril

Captopril and some calcium antagonists, not ramipril, are associated with increased risk of gynaecomastia.

C Carvedilol

Beta-blockers are not thought to be associated with significant risk of gynaecomastia, although some case

anti-androgen. This property is not shared by eplerenone, and in patients suffering from troublesome gynaecomastia, medication switching can resolve the problem.

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B	Ramipril

Captopril and some calcium antagonists, not ramipril, are associated with increased risk of gynaecomastia.

C	Carvedilol

Beta-blockers are not thought to be associated with significant risk of gynaecomastia, although some case reports of an association with nebivulol, where symptoms resolved after medication discontinuation, have been described.

E	Simvastatin

Simvastatin is rarely associated with gynaecomastia, but the frequency of reports of gynaecomastia are less than that for spironolactone; the mechanism is unclear.

A 38-year-old man presents with a 6-week history of feeling unwell and very lethargic. He is a known hypertensive. His wife tells you he has been rather stressed at work recently and is drinking fairly heavily.

As a child, he was found to have an abnormality in the structure of his heart though she is not sure what this is, but she does know that he has had problems with palpitations.

In Accident and Emergency, he has two generalised tonic-clonic seizures, which are treated with intravenous lorazepam.

Investigations:

Hb	13.4 g/dl
WCC	12 × 10^9/l
PLT	122 × 10^9/l
Neutrophils	8.4 × 10^9/l
Bilirubin	44 µmol/l (3–17)
Cholesterol	6.0 mmol/l
ALP	647 U/l (30–300)
ALT	110 U/l (5–35)
GGT	540 U/l (11–51)
CRP	84 µg/l (< 2)
TP	50 g/l (60–80)
INR	1.4
Albumin	28 g/l (35–50)

Which of the following drugs is the best choice for the long-term treatment of his seizures?

ALT	110 U/l (5-35)
GGT	540 U/l (11-51)
CRP	84 µg/l (< 2)
TP	50 g/l (60-80)
INR	1.4
Albumin	28 g/l (35-50)

Which of the following drugs is the best choice for the long-term treatment of his seizures?

A	Sodium valproate
B	Lamotrigine
C	Gabapentin
D	Vigabatrin
E	Carbamazepine

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B Lamotrigine

The most important intervention is for this patient to stop drinking, although this should take place under cover of a reducing course of benzodiazepines. Lamotrigine is an appropriate first-line intervention for seizures: it has the advantage of not being a CYP450 enzyme inducer or inhibitor, and has data suggesting it may reduce long-term alcohol dependence.

C Gabapentin

Gabapentin is a normal adjunctive therapy for patients with persistent seizures despite starting a first-line agent; as such, it's not the appropriate choice here.

A Sodium valproate

Sodium valproate should not be used in patients with hepatic dysfunction, because it is a CYP450 inhibitor.

D Vigabatrin

Vigabatrin is associated with peripheral visual field defects in up to 1/3 of users. It is also associated with suicidal ideation, and is therefore not an ideal option in a patient with alcoholism.

E Carbamazepine

Carbamazepine is a potent CYP450 enzyme inducer, and it may also be associated with AV conduction defects and is therefore not ideal in a patient with congenital heart disease.

A 36-year-old man is seen in Chest Clinic for follow up of his pulmonary tuberculosis (TB). He was diagnosed with pulmonary TB 3 months earlier when he presented to A&E with anorexia, sweats, weight loss and haemoptysis. Sputum microscopy showed acid-fast bacilli, and a few weeks later *Mycobacterium tuberculosis* was cultured. He was started on therapy with rifampicin, isoniazid, pyridoxine and ethambutol, with an improvement in his symptoms. His past medical history includes hypertension, hypercholesterolaemia and epilepsy. The epilepsy is now controlled on sodium valproate. His other regular medications include simvastatin, bendroflumethiazide and atenolol. There is also a history of occasional NSAID use for joint pains. He is a non-smoker and does not drink alcohol. He recently started working as a landscape gardener.

When reviewed in the Chest Clinic the patient is noted to have a malar rash across his face.

His GP had sent off an autoantibody screen, which was as follows:

RF	Negative
ANA	Negative
Anti-dsDNA	Negative
Anti-sm antibodies	Negative
Anti-histone antibodies	Positive

Which one of the following medications is most likely to have caused his rash?

A Simvastatin

B Ethambutol

weeks later *Mycobacterium tuberculosis* was cultured. He was started on therapy with rifampicin, isoniazid, pyridoxine and ethambutol, with an improvement in his symptoms. His past medical history includes hypertension, hypercholesterolaemia and epilepsy. The epilepsy is now controlled on sodium valproate. His other regular medications include simvastatin, bendroflumethiazide and atenolol. There is also a history of occasional NSAID use for joint pains. He is a non-smoker and does not drink alcohol. He recently started working as a landscape gardener.

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Anti-sm antibodies	Negative
Anti-histone antibodies	Positive

Which one of the following medications is most likely to have caused his rash?

A Simvastatin

B Ethambutol

C Isoniazid

D Pyridoxine

E Bendroflumethiazide

C isoniazid

A number of drugs have been shown to cause drug-induced lupus, the most common of which are hydralazine, procainamide, primidone, isoniazid, phenytoin and chlorpromazine. Drug-induced lupus is usually associated with positive anti-histone antibodies. However, compared with idiopathic systemic lupus erythematosus (SLE), there is no female preponderance, renal and CNS involvement is uncommon, and anti-dsDNA & anti-sm antibodies are generally absent. Most cases of drug-induced lupus resolve on withdrawal of the causative agent. Patients with the HLA-DR3 antigen appear to be particularly at risk of developing drug-induced lupus.

A Simvastatin

Simvastatin is associated with the development of eczema, purpuric drug reactions and pustular folliculitis, rather than drug-induced lupus.

B Ethambutol

The main concern of ethambutol therapy is the development of optic neuritis.

D Pyridoxine

Pyridoxine is given with isoniazid to prevent isoniazid induced neuropathy due to pyridoxine deficiency.

E Bendroflumethiazide

Bendroflumethiazide is associated with exfoliative dermatitis rather than with drug-induced lupus.

32788

Rate this question:

A 25-year-old man is admitted from the Accident and Emergency Department with increasing confusion over the past few weeks. He works as a demolition expert. He had recently attended his general practitioner (GP) with increasing headaches, hypersomnolence and abdominal pains.

Examination reveals pale conjunctivae and blue lines on his gums. No focal neurology, and abdominal examination is unremarkable.

Investigations:

Haemoglobin	10.2 g/dl
White cell count	9.8 × 10^9/l
Platelets	156 × 10^9/l
Mean cell volume (MCV)	79 fl
Lead level	61 µg/dl (< 10 µg/dl)

What is the best initial treatment?

A Dimercaptosuccinic acid

B Desferrioxamine

C Haemodialysis

D N-acetylcysteine

E Plasma exchange

A 25-year-old man is admitted from the Accident and Emergency Department with increasing confusion over the past few weeks. He works as a demolition expert. He had recently attended his general practitioner (GP) with increasing headaches, hypersomnolence and abdominal pains.

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Lead level	61 µg/dl (< 10 µg/dl)

What is the best initial treatment?

Your answer was correct

A	Dimercaptosuccinic acid
B	Desferrioxamine
C	Haemodialysis
D	N-acetylcysteine
E	Plasma exchange

Explanation

A Dimercaptosuccinic acid

Lead poisoning occurs mainly in children and presents mainly in those adults with an occupational exposure risk. The heavy metal affects many enzymes including those involved in the production of haem. The symptoms are varied and patients can have abdominal pains, headaches, confusion, peripheral motor neuropathy and lethargy. Examination may reveal lead lines on the gums or signs consistent with anaemia. A plasma lead level confirms the diagnosis and chelation therapy can be achieved by dimercaptosuccinic acid (DMSA) or calcium disodium edetate. After treatment a cause must be found to prevent re-exposure when discharged.

B Desferrioxamine

Desferrioxamine is a chelating agent primarily used in the treatment of iron toxicity.

C Haemodialysis

In this context, with chronic lead poisoning, chelation therapy with DMSA or calcium disodium edetate is the most appropriate intervention.

D N-acetylcysteine

N-acetylcysteine is used in the treatment of paracetamol overdose, and may have a role for some patients in the management of hepatic encephalopathy.

E Plasma exchange

Plasma exchange is of most utility in the management of antibody mediated conditions.

A 25-year-old hairdresser is brought in via ambulance to the Emergency Department, and you have been asked to attend. She has ingested an unknown quantity of her father's dothiepin tablets in the previous few hours.

She has a Glasgow Coma Score (GCS) of 9 with dilated pupils, has a heart rate of 95 beats/min and a blood pressure of 110/65 mmHg. Her finger-prick blood glucose is 5.6 mmol/l. You are given a copy of her electrocardiogram (ECG), which shows broadening of the QRS complexes.

Which of the following is the most appropriate intervention?

A	Intravenous (iv) Glucagon 5 mg
B	iv Naloxone 800 mcg
C	iv Sodium bicarbonate 50 mmol
D	iv Flumazenil 200 mcg
E	iv Calcium chloride 10 ml of 10% solution

Question 45 of 178

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Your answer was correct

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B	iv Naloxone 800 mcg
C	iv Sodium bicarbonate 50 mmol
D	iv Flumazenil 200 mcg
E	iv Calcium chloride 10 ml of 10% solution

Explanation

C iv Sodium bicarbonate 50 mmol

Rana Alnasser's screen

Explanation

C iv Sodium bicarbonate 50 mmol

QRS widening is a bad prognostic sign in patients who have taken a tricyclic antidepressant (TCA) overdose. Once QRS is greater than 100 ms, the risk of seizures and ventricular arrhythmias rises significantly and IV sodium bicarbonate is the intervention of choice. It works by reducing TCA binding to the myocardium.

A Intravenous (iv) Glucagon 5 mg

High-dose glucagon, where available, is an intervention for beta blocker overdose, because it exerts a beta blocker-independent effect on increasing both heart rate and contractility.

B iv Naloxone 800 mcg

Naloxone is a reversal agent for opiate overdose, and is a potential option for patients in peri-respiratory arrest who have suffered an iatrogenic opiate overdose or who are recreational users of heroin.

D iv Flumazenil 200 mcg

Flumazenil is a reversal agent for benzodiazepine overdose. Use in patients who are habituated to benzodiazepines is, however, not recommended because rapid reversal may drive an increased risk of seizures.

E iv Calcium chloride 10 ml of 10% solution

Calcium chloride is given for cardioprotection where there is significant hyperkalaemia.

A 22-year-old woman is admitted after taking an overdose of 30 × 300 mg aspirin tablets. She begins to suffer from severe tinnitus, feels light-headed and starts to vomit about 1 h after her overdose and attends the Emergency Department.

On examination, her blood pressure (BP) is 130/70 mmHg, her pulse is 85/min regular. She is very anxious and complains of a continuous ringing in her ears. Her respiratory rate is 36/min.

Which of the following sets of arterial blood gas results would fit best with her clinical picture?

A	pH 7.1; pCO_2 4.8 kPa; pO_2 7.1 kPa
B	pH 7.5; pCO_2 2.9 kPa; pO_2 12.1 kPa
C	pH 7.1; pCO_2 5.1 kPa; pO_2 13.1 kPa
D	pH 7.3; pCO_2 4.5 kPa; pO_2 12.1 kPa
E	pH 7.4; pCO_2 6.7 kPa; pO_2 8.1 kPa

21216

A 22-year-old woman is admitted after taking an overdose of 30 × 300 mg aspirin tablets. She begins to suffer from severe tinnitus, feels light-headed and starts to vomit about 1 h after her overdose and attends the Emergency Department.

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C pH 7.1; pCO_2 5.1 kPa; pO_2 13.1 kPa

D pH 7.3; pCO_2 4.5 kPa; pO_2 12.1 kPa

E pH 7.4; pCO_2 6.7 kPa; pO_2 8.1 kPa

Explanation

B pH 7.5; pCO_2 2.9 kPa; pO_2 12.1 kPa

The early period of aspirin overdose is associated with respiratory alkalosis, as characterised by raised pH and hypocapnia. Late complications include encephalopathy and seizures, pancreatitis and acute kidney disease.

Rana Alnasser's screen

B pH 7.5; pCO_2 2.9 kPa; pO_2 12.1 kPa

The early period of aspirin overdose is associated with respiratory alkalosis, as characterised by raised pH and hypocapnia. Late complications include encephalopathy and seizures, pancreatitis and acute kidney disease. Thankfully, however, the mortality rate associated with aspirin overdose is only around 1%. We are not given the results of other metabolic parameters, but given that the CO_2 values are low, the high pH represents respiratory alkalosis.

A pH 7.1; pCO_2 4.8 kPa; pO_2 7.1 kPa

Given the CO_2 is in the normal range, the pH is consistent with a metabolic acidosis, which is seen only in the later stages of aspirin overdose.

C pH 7.1; pCO_2 5.1 kPa; pO_2 13.1 kPa

Given the CO_2 is only 5.1, this blood gas result is also consistent with a metabolic acidosis, only seen in the later stages of aspirin overdose.

D pH 7.3; pCO_2 4.5 kPa; pO_2 12.1 kPa

The pH is only slightly below the normal range at 7.3, and represents a metabolic acidosis given the CO_2 is 4.5.

E pH 7.4; pCO_2 6.7 kPa; pO_2 8.1 kPa

The CO_2 is elevated here, meaning that the blood gas picture, including a normal pH, fits best with a compensated respiratory acidosis.

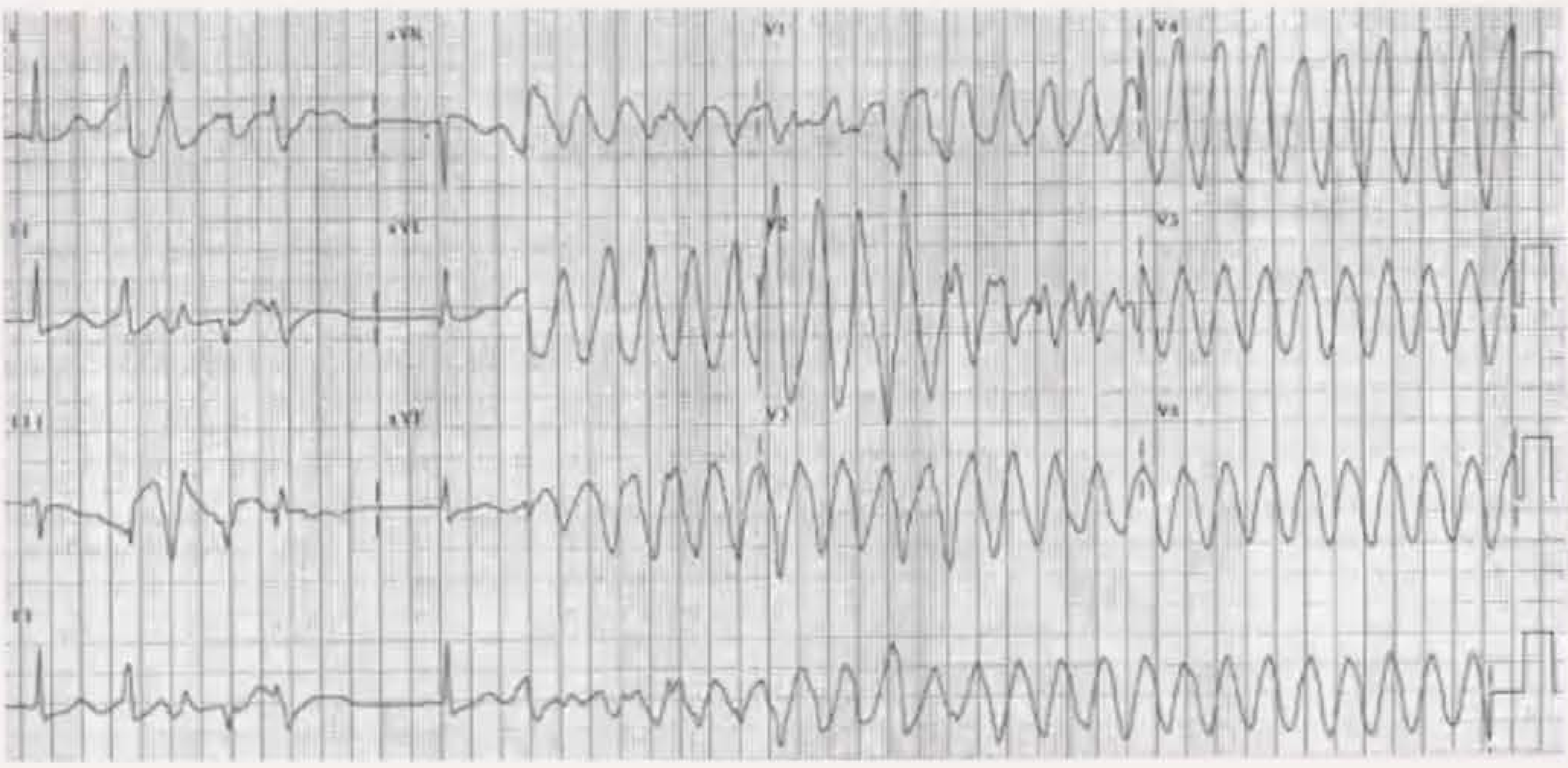
21218

Rate this question:

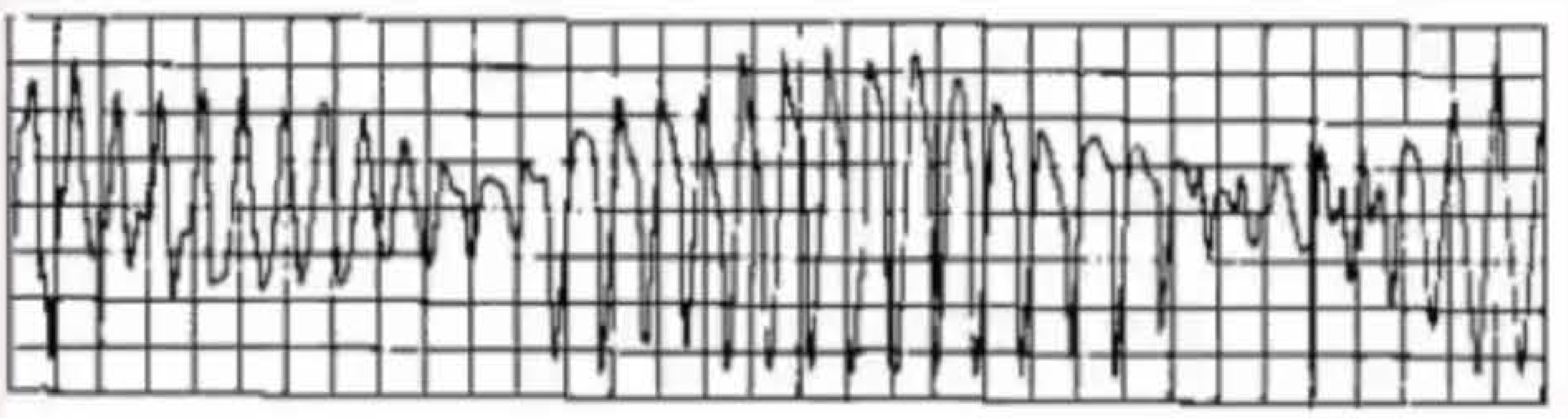
A 69-year-old woman had been referred from Medical Admissions to the Cardiology Ward after two episodes of syncope and palpitations.

She was admitted 3 days ago for cardioversion of her lone atrial fibrillation (AF). This had been successfully converted to sinus rhythm, and she was started on disopyramide 250 mg twice daily and discharged.

She has been readmitted today with palpitations; a standard 12-lead electrocardiogram (ECG) is shown below.



Following this, she was placed on telemetry, and an episode of palpitations was captured on the monitor. This is shown below.

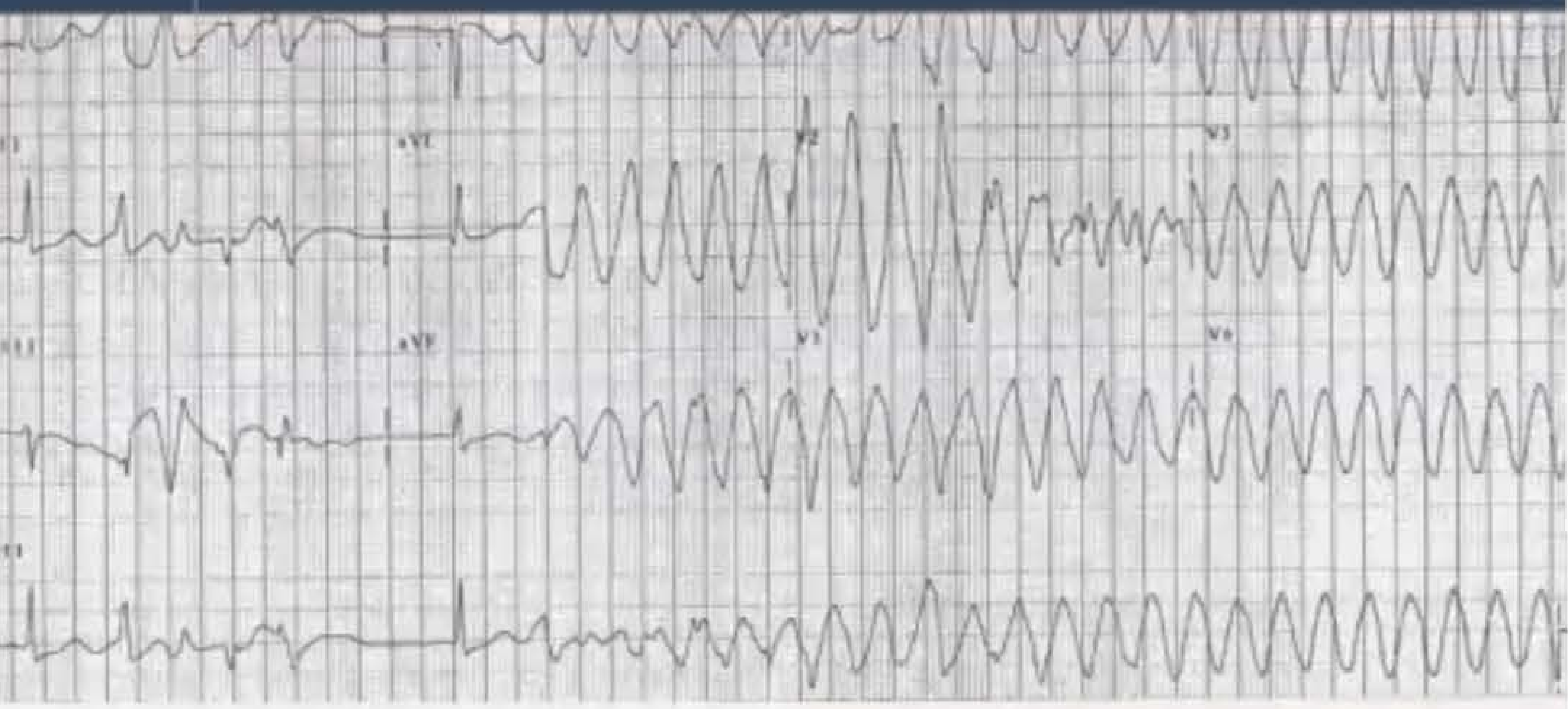


Her urea and electrolyte levels and full blood counts are within normal range.

What would be the most appropriate step in the immediate management of this patient?

A Add in amiodarone

Rana Alnasser's screen



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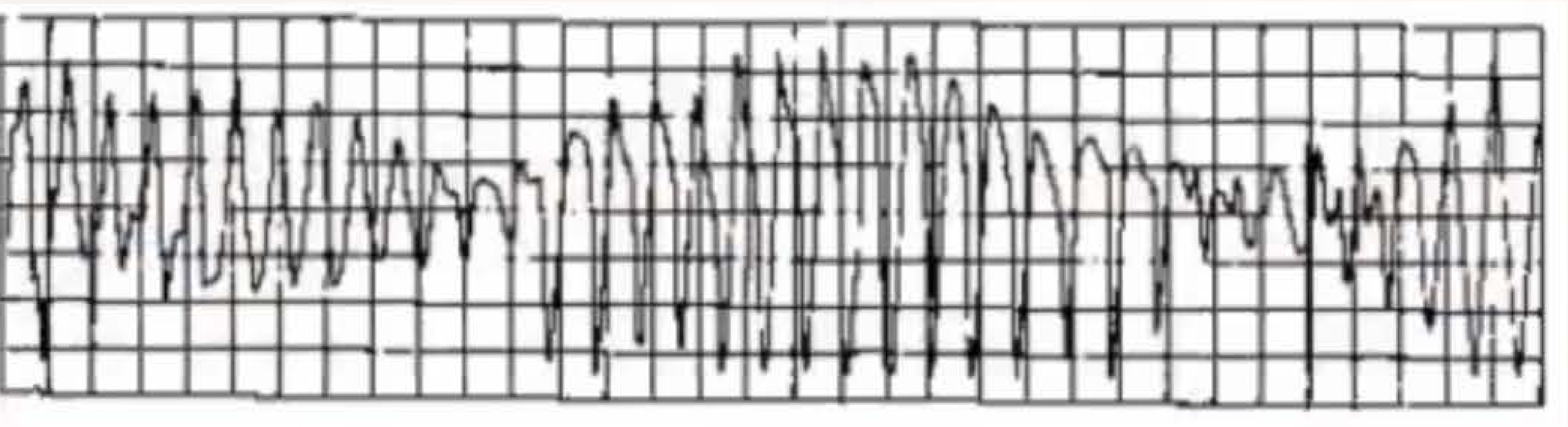

Her urea and electrolyte levels and full blood counts are within normal range.

What would be the most appropriate step in the immediate management of this patient?

A Add in amiodarone

B Stop the disopyramide

C Add in digoxin

D Increase the disopyramide to tds

E Add in low-dose atenolol

Rana Alnasser's screen

B Stop the disopyramide

This woman had torsades de pointes, often translated as a 'twisting of the points', which refers to the beat-to-beat changes in the QRS axis. Although torsades de pointes can occur in many settings (such as heart block), it is usually seen in patients with one of the congenital long QT syndromes or in association with drug therapy. The drugs commonly involved are: disopyramide, procainamide, quinidine, sotalol and terfenadine. Other drugs where the risk is associated with the dose are: amiodarone, arsenic trioxide, cisapride, calcium channel blockers, clarithromycin, erythromycin, pentamidine, anti-emetic agents, antipsychotic agents and methadone.

The arrhythmia in this patient was provoked by disopyramide, and it is possible that she could have the subclinical form of a long QT syndrome (subclinical forms are often revealed by QT-prolonging drugs). This is why, in her case, the prolonged QT would not have been picked up on testing at the time of her cardioversion.

A Add in amiodarone

This risks further prolongation of the QT interval, leading to an increased risk of sustained ventricular tachycardia (VT).

C Add in digoxin

Digoxin has no effect on reducing the risk for torsades de pointes and has a limited role in the management of AF in patients where other options are not appropriate.

D Increase the disopyramide to tds

Disopyramide has precipitated the episode of torsades de pointes; therefore, increasing it will further increase the risk

syndromes or in association with drug therapy. The drugs commonly involved are: disopyramide, procainamide, quinidine, sotalol and terfenadine. Other drugs where the risk is associated with the dose are: amiodarone, arsenic trioxide, cisapride, calcium channel blockers, clarithromycin, erythromycin, pentamidine, anti-emetic agents, antipsychotic agents and methadone.

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D Increase the disopyramide to tds

Disopyramide has precipitated the episode of torsades de pointes; therefore, increasing it will further increase the risk for sustained VT.

E Add in low-dose atenolol

Low-dose atenolol prolongs the action potential and therefore further exacerbates the risk of torsades de pointes.

2513

A 23-year-old woman presents two days after a paracetamol overdose. She complains of persistent vomiting.

On examination, she looks unwell, is markedly tender in the epigastrium, and she has a pulse of 100/min, regular, and a blood pressure (BP) of 115/60 mmHg.

Investigations:

Hb	10.9 g/dl
WCC	5.7 × 10^9/l
PLT	100 × 10^9/l
INR	2.7
Na^+	139 mmol/l
K^+	5.9 mmol/l
Creatinine	235 µmol/l
Ph	7.2
pO_2	8.5 kPa
pCO_2	3.9 kPa
Bicarb	14 mmol/l
Glucose	3.9 mmol/l
Urine output	35 ml in the past 4 h

She is admitted to the high-dependency unit. Which of the following other interventions is likely to have the biggest positive effect on her prognosis?

A	Haemofiltration
B	Haemodialysis

PLT	100×10^9/l
INR	2.7
Na^+	139 mmol/l
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She is admitted to the high-dependency unit. Which of the following other interventions is likely to have the biggest positive effect on her prognosis?

A	Haemofiltration
B	Haemodialysis
C	Sodium bicarbonate IV
D	N-acetylcysteine IV
E	Activated charcoal via NG

11:11

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Pastest+ Question 48 of 178

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She is admitted to the high-dependency unit. Which of the following other interventions is likely to have the biggest positive effect on her prognosis?

Your answer was incorrect

B Haemodialysis

Of most concern is the tailing-off of this woman's urine output, metabolic acidosis and elevated potassium. This is suggestive of acute tubular necrosis. Kidney disease associated with paracetamol overdose is recoverable, and even this woman has a reasonable chance of attaining normal renal function after the acute event, as such, haemodialysis is the most appropriate next step.

D N-acetylcysteine IV

N-acetylcysteine, even when used late, may reduce liver damage and hence it should be used even now, although the relative impact on outcome is less than that for haemodialysis.

A Haemofiltration

Haemofiltration is much less effective than haemodialysis in this situation, and her blood pressure would support haemodialysis, making this the preferred option.

C Sodium bicarbonate IV

This may promote fluid retention and not have a major impact on urine output or creatinine.

E Activated charcoal via NG

At this stage all of the paracetamol will have been absorbed from the GI tract, meaning there is little role for activated charcoal here.

You are asked to urgently review a 27-year-old zookeeper. He has been bitten by a coral snake and has become acutely unwell.

He is hypotensive with a blood pressure of 85/60 mmHg, pulse is 95 bpm and regular. He is losing consciousness with obvious muscle weakness and difficulty swallowing his saliva.

Which of the following statements is most correct regarding acute treatment for this snake bite?

A	The affected part should be immobilised above the level of the heart
B	A tourniquet should be immediately applied
C	Any clothing should not be disturbed
D	Use of ice on a snake bite is discouraged
E	Patients should be given a warm drink

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D Use of ice on a snake bite is discouraged

Ice is discouraged in the management of snake bites because it has been associated with increased necrosis of the skin and soft tissue around the bite.

A The affected part should be immobilised above the level of the heart

The affected area should be immobilised below the level of the heart, to minimise venous return.

B A tourniquet should be immediately applied

As tourniquets may exacerbate tissue necrosis, their use should only be considered by an experienced physician.

C Any clothing should not be disturbed

Any constricting clothing should be removed.

E Patients should be given a warm drink

The victim should be kept warm, but caffeine-containing drinks and alcohol should be avoided.

Coral snake venom results in neurological symptoms such as ptosis, dysphagia, dysarthria, intense salivation and later loss of deep tendon reflexes and respiratory depression. In the USA there are around 9-15 snake bite fatalities per year, mostly in children and the elderly and where treatment has been delayed.

A 28-year-old woman has been given a course of iron supplements to correct iron deficiency anaemia, which has occurred after the birth of her second baby. She is known to be suffering from post-natal depression and presents to the Emergency Department having taken 28 iron sulphate tablets some 5 h previously. She is complaining of abdominal pain and vomiting and asks for assistance.

On examination, she looks unwell, but is maintaining her airway; she has a blood pressure of 90/60 mmHg and pulse 95/min regular. While in the department she becomes drowsier and suffers profuse diarrhoea.

Which one of the following would be an appropriate initial intervention in this case?

A IV desferrioxamine
B Oral- activated charcoal
C Oral penicillamine
D Haemodialysis
E Exchange transfusion

32822

A 28-year-old woman has been given a course of iron supplements to correct iron deficiency anaemia, which has occurred after the birth of her second baby. She is known to be suffering from post-natal depression and presents to the Emergency Department having taken 28 iron sulphate tablets some 5 h previously. She is complaining of abdominal pain and vomiting and asks for assistance.

On examination, she looks unwell, but is maintaining her airway; she has a blood pressure of 90/60 mmHg and pulse 95/min regular. While in the department she becomes drowsier and suffers profuse diarrhoea.

Which one of the following would be an appropriate initial intervention in this case?

A	IV desferrioxamine
B	Oral- activated charcoal
C	Oral penicillamine
D	Haemodialysis
E	Exchange transfusion

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Your answer was correct

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C Oral penicillamine
D Haemodialysis
E Exchange transfusion

Explanation

A IV desferrioxamine

Ingestion of large amounts of iron may lead to acute circulatory collapse accompanied by hypotension, as in this

Explanation

A IV desferrioxamine

Ingestion of large amounts of iron may lead to acute circulatory collapse accompanied by hypotension, as in this case. IV desferrioxamine at the rate of 15 mg/kg/h is an initial treatment of choice, and starting it as early as possible is important. If hypotension/circulatory collapse is not present, then it may be given IM at the rate of 2 g every 6–12 h.

B Oral- activated charcoal

Activated charcoal is a poor absorber of iron, and gastric lavage with instillation of desferrioxamine via the NG is the preferred approach.

C Oral penicillamine

Oral penicillamine is primarily used as a copper chelator in the treatment of Wilson's disease.

D Haemodialysis

This is used as an option for patients who fail to respond to fluid resuscitation and IV desferrioxamine alone.

E Exchange transfusion

Severe iron intoxication can be treated with exchange transfusion, although this is reserved for patients who fail to respond to other interventions first.

Tricyclic antidepressants (TCAs) like dothiepin and amitriptyline are mainly used for the treatment of depression. In overdose they can cause anticholinergic effects resulting in mydriasis, confusion, dry mouth, constipation and urinary retention. They can have a profound effect on cardiac conduction with resultant QT prolongation and torsades de pointes. Sodium bicarbonate is the mainstay of therapy, with many guidelines also recommending magnesium sulphate particularly when torsades, rather than QRS prolongation alone, is noted on the ECG.

A Charcoal haemoperfusion

Haemodialysis and haemoperfusion are not effective in removing TCAs.

C Amiodarone infusion

This leads to prolongation of the action potential; hence it actually increases the risk of arrhythmia here.

D Ammonium chloride

Alkalinisation of urine is not indicated in TCA overdose.

E Metoprolol

Prolongation of the action potential will increase the risk of VT occurring in this patient.

B Methylphenidate

The patient has narcolepsy with symptoms of excessive daytime somnolence, hypnological hallucinations and sleep paralysis. He currently doesn't show signs of cataplexy. There is a genetic predisposition to narcolepsy and it is strongly associated with HLA-DR2. The diagnosis is supported by overnight sleep studies and a multi-sleep latency test. The patient should first try non-pharmacological therapies such as creating a sleep timetable and decreasing alcohol intake. Central nervous system stimulants such as methylphenidate are used to treat narcolepsy.

A Temazepam

Benzodiazepines can actually worsen sleep disturbance and exacerbate symptoms of narcolepsy.

C Clomipramine

Low doses of clomipramine, (a tricyclic anti-depressant), are used in the treatment of cataplexy rather than narcolepsy.

D Fluoxetine

Fluoxetine, like clomipramine has been shown to reduce symptoms of cataplexy. Data exists to support a benefit for a range of SSRIs, used at a mid to high dose.

E Alcohol

Increased alcohol consumption has a negative effect on symptoms of narcolepsy because of interference with normal sleep patterns.

A 49-year-old woman known to have bronchial asthma of 10 years' duration presents to the Emergency Department. There is a history of incessant vomiting, agitation, polyuria and polydipsia.

On examination, she was hyperventilating and apprehensive. Blood pressure was 90/70 mmHg, pulse was 112/min. All her systems were otherwise unremarkable.

On further questioning she admits to having taken a large, mixed overdose of a number of tablets used for the treatment of her asthma and her depression.

Investigations:

pH	7.1
HCO_3^-	11 mmol/l
Chloride	108 mmol/l
$paCO_2$	4.7 kPa
paO_2	12 kPa
K^+	2.3 mmol/l
Na^+	135 mmol/l
Glucose	5.0 mmol/l

What is the most likely explanation for the clinical and biochemical picture?

A	Diazepam overdose
B	Theophylline overdose
C	Citalopram overdose
D	Monteleukast overdose

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What is the most likely explanation for the clinical and biochemical picture?

A Diazepam overdose

B Theophylline overdose

C Citalopram overdose

D Monteleukast overdose

E Olanazapine overdose

32858

B Theophylline overdose

This asthmatic lady has gastrointestinal features associated with an agitated state, with metabolic acidosis, hypokalaemia, and tachycardia. She also has thirst and polyuria. These are the common features of toxicity from theophylline and related drugs. The other features, such as cardiac arrhythmias, hypotension, metabolic acidosis and convulsions, indicate severe poisoning and a poor prognosis, particularly in the elderly. An urgent gastric lavage can be performed, although this is most useful if in the first 1-2 h after overdose. Repeated activated charcoal can also be considered according to the prescribing information and overdose guidelines. Cardiac monitoring should be continued. Correction of hypokalaemia should be performed with electrocardiography (ECG) control, as large doses of potassium chloride may be required IV. Agitation and convulsions are treated with IV diazepam. In severe poisoning with a plasma level of theophylline >60 mg/l, haemoperfusion should be considered. During the recovery period hyperkalaemia may result, which can *per se* require treatment.

A Diazepam overdose

Diazepam overdose is associated with respiratory acidosis driven by hypoventilation and CO_2 retention.

C Citalopram overdose

Citalopram overdose isn't associated with hypokalaemia - it is associated with symptoms of tremor, agitation, hypertension and possible serotonin syndrome.

D Monteleukast overdose

Monteleukast overdose is not associated with symptoms in the majority of cases - in some cases patients report

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Question 24 of 128

A 52-year-old man with a history of COPD presents with jaundice. He has a history of hypertension for which he receives ramipril and amlodipine, and hypercholesterolaemia which is treated with a statin. He takes theophylline tablets for his COPD. He consulted his general practitioner (GP) two weeks earlier and was prescribed an antibiotic for two weeks for a lower respiratory tract infection.

On examination, he is jaundiced and has signs of scratch marks over his upper body. He tells you he has been passing dark urine.

Investigations:

Hb	13.1 g/dl
WCC	8.1 × 10^9/l
PLT	204 × 10^9/l
Na^+	139 mmol/l
K^+	4.4 mmol/l
Creatinine	110 μmol/l
Bilirubin	204 μmol/l
Alk Phos	320 U/l
ALT	95 U/l

Which of the following antibiotics is most likely to have been responsible?

A	Ciprofloxacin
B	Cephalexin
C	Co-amoxiclav

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Which of the following antibiotics is most likely to have been responsible?

A Ciprofloxacin

B Cephalexin

C Co-amoxiclav

D Erythromycin

E Penicillin V

C Co-amoxiclav

Co-amoxiclav is strongly associated with obstructive jaundice, particularly when used for a period of 2 weeks or longer. It was the subject of a drug safety update from the MHRA specifically to discourage prolonged prescribing. It is also a recommended initial intervention for the treatment of respiratory infection.

A Ciprofloxacin

Ciprofloxacin is rarely used in conjunction with theophylline because as a CYP450 inhibitor it can lead to a marked increase in theophylline levels. Hence GPs are educated not to use it in this situation. It is associated with obstructive jaundice, but more rarely than co-amoxiclav.

B Cephalexin

Cephalexin is rarely associated with transient hepatitis and cholestatic jaundice. Elevation in transaminases is much more commonly seen.

D Erythromycin

Like ciprofloxacin, erythromycin is a P450 inhibitor, which means it is less likely to be used here given the prescription of theophylline. It is more likely to be associated with elevated transaminases rather than obstructive jaundice.

E Penicillin V

Penicillin V is usually reserved for treatment of *S. pyogenes* pharyngeal infection, rather than respiratory tract infection, and amoxicillin/co-amoxiclav are favoured under BTS guidelines.

A 40-year-old man attends clinic for investigation of heartburn symptoms. He has recently had an upper gastrointestinal (GI) endoscopy that has shown a shallow duodenal ulcer. The biopsies have shown the patient to be positive for *Helicobacter pylori*. He is currently only taking omeprazole and is allergic to penicillin.

Which two antibiotics should be used for eradication therapy?

A	Ciprofloxacin and metronidazole
B	Clarithromycin and metronidazole
C	Tobramycin and ciprofloxacin
D	Tetracycline and amoxicillin
E	Chloramphenicol and metronidazole

32791

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Which two antibiotics should be used for eradication therapy?

Your answer was correct

- A Ciprofloxacin and metronidazole
- B Clarithromycin and metronidazole
- C Tobramycin and ciprofloxacin
- D Tetracycline and amoxicillin
- E Chloramphenicol and metronidazole

Explanation

B Clarithromycin and metronidazole

For patients who are penicillin allergic the recommended intervention for *H. pylori* eradication is a 1-week course of therapy with clarithromycin, metronidazole and a PPI. A post- treatment breath test may be used to confirm eradication in the event that symptoms continue. Two weeks of therapy is considered when a MALT lymphoma has been identified.
]

Explanation

B Clarithromycin and metronidazole

For patients who are penicillin allergic the recommended intervention for *H. pylori* eradication is a 1-week course of therapy with clarithromycin, metronidazole and a PPI. A post- treatment breath test may be used to confirm eradication in the event that symptoms continue. Two weeks of therapy is considered when a MALT lymphoma has been identified.

A Ciprofloxacin and metronidazole

Resistance rates of *H. pylori* are increasing to ciprofloxacin; this makes clarithromycin the preferred choice in patients who are penicillin allergic.

C Tobramycin and ciprofloxacin

Tobramycin is used in the ITU setting for gut decontamination of critically ill patients; it is not part of the standard approach to routine *H. pylori* eradication.

D Tetracycline and amoxicillin

This is not a standard approach to eradication, and penicillin allergy precludes use of amoxicillin.

E Chloramphenicol and metronidazole

Chloramphenicol is reserved for life-threatening infections where resistance exists to other antibiotics, and is not used in routine practice for *H. pylori* eradication.

]

A 72-year-old man with a history of Parkinson's-like symptoms, postural hypotension and urinary retention presents for review. Unfortunately, his condition has deteriorated to the extent that he can only walk a few yards at a time and he has become profoundly depressed. He is now hearing voices telling him that he is worthless and that he should kill himself. There has been one previous suicide attempt in the past week, involving a large overdose of his L-dopa tablets.

Which of the following would be the most appropriate treatment for his depression?

A	Fluoxetine
B	Amitryptilline
C	Paroxetine
D	Chlorpromazine
E	Clozapine

E Clozapine

Given the prominent auditory hallucinations and one significant suicide attempt in the last week, an anti-psychotic is the most appropriate intervention. Clozapine is under-utilised because of the need for therapeutic drug monitoring, although in Parkinson's-related psychosis it is recognised to be the most effective agent with respect to relieving symptoms.

A Fluoxetine

SSRIs are likely to be inadequate here with respect to relieving symptoms, may exacerbate motor symptoms and are associated with increased risk of the serotonin syndrome in patients co-prescribed L-dopa.

B Amitryptilline

Tricyclic anti-depressants in this situation are not the preferred option because they won't impact on the psychotic symptoms seen here.

C Paroxetine

For the same reasons that fluoxetine is not advised in the treatment of Parkinson's disease (exacerbation of motor symptoms and risk of serotonin syndrome), paroxetine should also be avoided.

D Chlorpromazine

Chlorpromazine is not advised because traditional anti-psychotics can significantly worsen motor symptoms of Parkinson's disease.

Question 27 of 128

You are asked to review some blood results by the House Officer on call with you one Saturday evening. He has seen a 30-year-old man in the Emergency Department who was brought in by a friend.

He tells you that the patient is generally unwell, with a heart rate of 120/min and a blood pressure of 139/58 mmHg, and is short of breath with a respiratory rate of 25/min.

His arterial blood gases on high-flow oxygen are:

pH	7.19
$p(CO_2)$	1.1 kPa
$p(O_2)$	29.6 kPa
HCO_3^-	7.8 mmol/l
Base excess	-22.0 mmol/l

Biochemistry Investigations:

Sodium	142 mmol/l
Potassium	4.0 mmol/l
Urea	5.2 mmol/l
Creatinine	169 µmol/l
Glucose	7.0 mmol/l
Bicarbonate	6.0 mmol/l
Chloride	89 mmol/l
Phosphate	1.19 mmol/l

It is considered that he may have been poisoned.

Which of the following is the most likely cause?

A Lisinopril

Rana Alnasser's screen

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Which of the following is the most likely cause?

A	Lisinopril
B	Methanol
C	Metoprolol
D	Amiodarone
E	Acetazolamide

B Methanol

This patient has a high anion gap metabolic acidosis with evidence of attempted respiratory compensation. Sodium and potassium make up the majority of the extracellular cations (95%), whereas chloride and bicarbonate constitute 85% of the extracellular anions. As more cations are measured, this will give a normal anion gap of around 12–16 mmol/l (($Na^+ + K^+$) - ($Cl^- + HCO_3^-$)). In some cases of metabolic acidosis, this gap will be elevated. One can see that in the question the anion gap is (142 + 4) - (6 + 89) = 51. A number of causes of high anion gap metabolic acidosis exist, including methanol, metformin and isoniazid.

A Lisinopril

Lisinopril overdose can result in marked hypotension with kidney disease, but doesn't result in raised anion gap metabolic acidosis.

C Metoprolol

Metoprolol overdose is associated with marked hypotension and bradycardia rather than the picture seen here.

D Amiodarone

Overdose of amiodarone is associated with extreme bradycardia, heart block, hypotension and cardiogenic shock.

E Acetazolamide

You are reviewing a patient with hepatitis B and evidence of chronic active hepatitis, and you plan to instigate therapy with entecavir.

Which of the following correctly describes the mode of action of entecavir?

A	Non-nucleoside reverse transcriptase inhibitor (NNRTI)
B	M2 proton pump inhbitor
C	Interferon alpha-2a agonist
D	Nucleoside analogue
E	Protease inhibitor

36031

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D Nucleoside analogue

Entecavir is a pro-drug and requires phosphorylation to the triphosphate form before it becomes active. It works by inhibiting the priming of HBV polymerase, blocking reverse transcription of the negative-strand DNA and synthesis of the positive-strand DNA of the virus. Clinical trials suggest increased viral clearance versus lamivudine; it is now recommended as an option for initial treatment of hepatitis B by NICE.

E Protease inhibitor

Protease inhibitors are used in the treatment of hepatitis C and HIV, boceprevir being an example of an NS3/4A protease inhibitor used in the treatment of hepatitis C.

A Non-nucleoside reverse transcriptase inhibitor (NNRTI)

NNRTIs are used in the treatment of HIV, with nevirapine being an example of a first-generation NNRTI that works by inhibiting HIV reverse transcriptase.

B M2 proton pump inhbitor

Amantadine is an M2 proton pump inhibitor that was developed for the treatment of influenza, and has been used in the treatment of Parkinson's disease (although its mechanism of action in Parkinson's is unknown).

C Interferon alpha-2a agonist

Interferon alpha-2a is used in pegylated form for intermittent administration in the treatment of some patients with hepatitis B and C

A 69-year-old patient from India is admitted to hospital. The patient's relatives are concerned as over past few weeks he has become forgetful with increasing lethargy and weakness. They have noticed a scaly skin rash appearing on his face and scalp. His mouth and gums have become inflamed and as a result his oral intake has declined. He is currently on treatment for pulmonary tuberculosis and Parkinson's disease.

Neurological examination reveals cogwheel rigidity and decreased distal limb sensation in a stocking distribution.

His medication list, as written on a piece of paper by his wife, reads: "madopar, paracetamol, lansoprazole, gaviscon, fybogel, rifampicin, isoniazid, pyrazinamide, salbutamol inhaler".

Initial investigations reveal:

Haemoglobin	9.5 g/dl
White cell count	10.3 × 10⁹/l
Platelets	212 × 10⁹/l
Mean corpuscular volume (MCV)	76 fl (80–96 fl)
Sodium	142 mmol/l
Potassium	3.9 mmol/l
Urea	5.3 mmol/l
Creatinine	68 μmol/l
Serum iron	23 μmol/l (12–30 μmol/l)
Serum iron binding capacity	35 μmol/l (45–75 μmol/l)

The patient is commenced on appropriate treatment based on the above history, examination and blood results

What might be a consequence of treatment for his

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The patient is commenced on appropriate treatment based on the above history, examination and blood results

What might be a consequence of treatment for his anaemia?

A Worsening of Tuberculosis

B Worsening of Parkinson's

C Hypocalcaemia

D Black discolouration of stools

E Reversible red-green colour blindness

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E Reversible red-green colour blindness

Explanation

B **Worsening of Parkinson's**

The patient has pyridoxine deficiency, most likely secondary to isoniazid therapy. The symptoms are confusion, seborrhoeic dermatitis, stomatitis and peripheral neuropathy. It can also cause a non-iron-deficient microcytic anaemia, as pyridoxine is required as a cofactor in the manufacture of porphyrins for the synthesis of haemoglobin. Pyridoxine is therefore the intervention of choice, although it does lead to an increase in the peripheral metabolism of levodopa and can therefore worsen symptoms of Parkinson's disease.

D **Black discolouration of stools**

Black discoloration of stools is seen with iron replacement therapy.

A Worsening of Tuberculosis

Pyridoxine is usually supplemented with isoniazid therapy and does not impact on its efficacy.

C Hypocalcaemia

Hypocalcaemia does not occur in conjunction with pyridoxine therapy.

E Reversible red-green colour blindness

Ethambutol, not pyridoxine, can cause red-green colour blindness.

You are crash-called to the Emergency Department to review a 32-year-old fireman who has been involved in a fire at a polyurethane foam factory. The paramedics report that he was confused and complaining of chest tightness at the scene.

On transport, he appeared to rapidly develop pulmonary oedema, and soon after arrival in the Emergency Department he suffered respiratory arrest. His pulse is 77/min and regular; blood pressure (BP) is 90/70 mmHg.

He is intubated and ventilated; which of the following agents represents the next most appropriate intervention?

A Atropine

B 2,3-dimercapto succinic acid (DMSA)

C Dicobalt edetate

D Fomepizole

E Dimercaprol

You are crash-called to the Emergency Department to review a 32-year-old fireman who has been involved in a fire at a polyurethane foam factory. The paramedics report that he was confused and complaining of chest tightness at the scene.

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Your answer was incorrect

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D Fomepizole

E Dimercaprol

Explanation

C Dicobalt edetate

It is most likely that this patient has been exposed to cyanide fumes, which may be released from burning polyurethane foams. Cyanide acts by irreversibly blocking mitochondrial electron transport. Early signs of exposure

Explanation

C Dicobalt edetate

It is most likely that this patient has been exposed to cyanide fumes, which may be released from burning polyurethane foams. Cyanide acts by irreversibly blocking mitochondrial electron transport. Early signs of exposure include dizziness, chest tightness and confusion; later signs include pulmonary oedema, cardiovascular collapse, apnoea and paralysis; death occurs within minutes. Patients should be intubated and ventilated, and the antidote of choice is dicobalt edetate; sodium nitrite or sodium thiosulphate may be given as alternatives. Mouth-to-mouth resuscitation should not be attempted where there is a suspicion of cyanide exposure, due to risks to the resuscitator.

B 2,3-dimercapto succinic acid (DMSA)

DMSA is used to treat heavy metal poisoning, and is indicated for symptoms of lead, mercury or arsenic ingestion.

A Atropine

Atropine is an initial intervention for organophosphate poisoning, not for cyanide poisoning. In this situation it is highly unlikely to have any impact on supporting the circulation.

D Fomepizole

Fomepizole is an inhibitor of alcohol dehydrogenase, which does not lead to intoxication. It is used in the treatment of methanol and ethylene glycol overdose.

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E Dimercaprol

Dimercaprol is an alternative chelating agent to DMSA for the treatment of heavy metal poisoning.

Question 31 of 128

A 42-year-old patient is referred to the clinic with left-sided back pain and weight loss. He was previously fit and well and is an ex-smoker of 20 pack-years.

Examination reveals a mass palpable in the left flank. A computed tomography (CT) scan confirms the presence of a lobulated left adrenal mass with irregular margins and areas of necrosis and mediastinal lymphadenopathy. Histology confirms appearances suggestive of an adrenal cortical carcinoma.

Investigations:

Overnight dexamethasone suppression test	30 nmol/l (< 50)
Serum aldosterone recumbent	220 pmol/l (135-400)
Serum aldosterone upright	530 pmol/l (330-830)
Serum renin recumbent	1.5 pmol/ml/h (1.1-2.7)
Serum renin upright	3.6 pmol/ml/h (3.0-4.3)
Serum androstenedione	6.2 nmol/l (1.6-8.4)

24-h urine collection:

Vanillyl mandelic acid	6.3 µmol/24 h (5-35)
Noradrenaline	220 nmol/24 h (< 570)
Adrenaline	105 nmol/24 h (< 144)
Dopamine	2100 nmol/24 h (< 3100)

What medication should he be started on?

A Phentolamine

Serum renin recumbent	1.5 pmol/ml/h (1.1–2.7)
Serum renin upright	3.6 pmol/ml/h (3.0–4.3)
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What medication should he be started on?

A Phentolamine
B Metyrapone
C Mitotane
D Aminoglutethimide
E Ketoconazole

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C Mitotane

Mitotane is a cytostatic agent which also inhibits steroid hormone synthesis. It is of value in the treatment of adrenal cortical adenocarcinomas, including those which are non-functioning.

B Metyrapone

Metyrapone inhibits 11-beta hydroxylase, and it is therefore most useful in the treatment of hypercortisolaemia, not present here.

A Phentolamine

Phenoxybenzamine is the main alpha-adrenoceptor blocker used in the treatment of phaeochromocytoma.

D Aminoglutethimide

Aminoglutethimide blocks both aromatase and the cholesterol side-chain cleavage enzyme also known as P450scc. This means that it may be very useful in patients with virilising adrenal carcinomas.

E Ketoconazole

Ketoconazole is an alternative to metyrapone in blocking the synthesis of cortisol, so it doesn't have a major role here.

A 75-year-old woman is admitted with confusion and general deterioration. She was found in her flat in a state of self-neglect.

In hospital, she is diagnosed with a left lower lobe pneumonia and commenced on antibiotics. Her medical background includes angina, atrial fibrillation, osteoarthritis, asthma and diabetes.

Her medication is: glyceryl trinitrate spray, digoxin, warfarin, codeine phosphate, salbutamol inhaler, becotide inhaler and metformin. She is commenced on amoxicillin in hospital.

While an inpatient, she improves and the house physician on the ward notices a lesion on her scalp. It is a small, irregular, erythematous papule surrounded by pale, brittle hair. A dermatologist reviews the lesion and takes some hair samples for further examination.

After a microscopic examination, the dermatologist returns to the ward and prescribes a shampoo for the patient and an oral antifungal agent that works by inhibiting the mitotic spindle of the fungus.

What would be the most likely effect of the anti-fungal agent on this patient's blood tests?

A Increased INR

B Decreased INR

C Pancytopenia

D Hypoglycaemia

E Increased serum creatinine

Pastest+

Question 32 of 128

B Decreased INR

The drug commenced in this patient is griseofulvin. This oral antifungal is thought to work by inhibiting the mitotic spindle of the fungus and is used for the treatment of dermatophytes. It is a liver enzyme inducer, resulting in increased metabolism of anticoagulants, and hence a decrease in the international normalised ratio (INR). The azoles work by inhibiting the conversion of lanosterol to ergosterol, which is a step required in the synthesis of fungal cell membrane. They tend to be liver enzyme inhibitors.

A Increased INR

Azole antifungals and a range of antibacterials, including macrolides and quinolones, are recognised to increase the INR.

C Pancytopenia

Mammalian cell membranes are composed of cholesterol rather than ergosterol, Griseofulvin therefore has no effect on cell maturation/production, and hence doesn't lead to pancytopenia.

D Hypoglycaemia

Metformin reduces hepatic glucose output. Its metabolism isn't significantly affected by griseofulvin, and even if levels of metformin were increased this wouldn't lead to hypoglycaemia.

E Increased serum creatinine

Amphotericin B, not griseofulvin, which is used for serious

A 62-year-old man is admitted with malignant hypertension, drowsiness and vomiting. He has grade 4 hypertensive retinopathy on fundoscopy. He is managed with intravenous (iv) sodium nitroprusside and initially has a good response to therapy, with a reduction in blood pressure (BP) from 212/120 to 185/100 mmHg.

The nurses ask you to review him a few hours later as he has become increasingly drowsy and confused; the nurses tell you that he has also been short of breath and complaining of abdominal pain. His BP is 175/90 mmHg and his pulse is 75/min and regular.

Investigations:

		Normal Values
Hb	13.5 g/dl	
WCC	6.4 × 10⁹/l	
PLT	190 × 10⁹/l	
Na^+	139 mmol/l	
K^+	4.5 mmol/l	
Bicarbonate	11 mmol/l	
Creatinine	135 μmol/l	
Lactate	10 mmol/l	0.6-1.8 mmol/l

Which diagnosis should be suspected?

A	Cyanide toxicity
B	Hypertensive encephalopathy
C	Subarachnoid haemorrhage

with intravenous (IV) sodium nitroprusside and initially has a good response to therapy, with a reduction in blood pressure (BP) from 212/120 to 185/100 mmHg.

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Investigations:

		Normal Values
Hb	13.5 g/dl	
WCC	6.4×10^9/l	
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Bicarbonate	11 mmol/l	
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Which diagnosis should be suspected?

A	Cyanide toxicity
B	Hypertensive encephalopathy
C	Subarachnoid haemorrhage
D	Encephalitis
E	Methaemoglobinaemia

A Cyanide toxicity

Improperly stored nitroprusside for infusion, or nitroprusside which has been exposed to sunlight on the ward, is subject to degradation which may result in the formation of sodium cyanide. Cyanide poisoning is associated with hypertension and bradycardia, followed later by hypotension and coma. Abdominal pain and shortness of breath are other prominent features. The characteristic finding on examination is a marked elevation in lactate. Sodium thiosulphate, dicobalt edetate or sodium nitrite are possible treatments for cyanide poisoning.

B Hypertensive encephalopathy

Given that there has been a slight fall in blood pressure, hypertensive encephalopathy is less likely and it isn't associated with abdominal pain.

C Subarachnoid haemorrhage

Significant subarachnoid haemorrhage is more likely to be associated with either a further rise in blood pressure or at least stabilisation at the higher level. Again it would not be associated with abdominal pain.

D Encephalitis

Against a background of marked hypertension and no clinical signs of infection, encephalitis is extremely unlikely to be the cause of the deterioration seen here.

E Methaemoglobinaemia

Methaemoglobinaemia is associated with tissue hypoxia; however, other signs such as cyanosis would be expected given the symptom picture seen here

A 54-year-old veterinarian attends the Emergency Department, having been bitten by a snake while out walking his dog. He is sure that it was an adder, and asks whether he requires the antidote.

On examination, his blood pressure (BP) is 125/60 mmHg, his pulse is 85 bpm and regular and he feels anxious. You can see the marks from the adder bite with some surrounding erythema on his left lower leg.

Which of the following is an indication for administration of antivenom?

A	Previous anaphylaxis to antivenom
B	History of ischaemic heart disease
C	Visible puncture mark at the bite site
D	History of asthma
E	Severe limb swelling

E Severe limb swelling

The adder (*Vipera berus*) is the UK's indigenous venomous snake, although others, more poisonous, are kept in captivity. There is an available antivenom, but it must be remembered that there is a 1% chance of having an anaphylactic reaction to this, and so adrenaline should be available during its administration. Indications for its use include signs of systemic envenomation such as persistent hypotension, electrocardiogram (ECG) abnormalities, vomiting, haemostatic abnormalities, white cell count above 20 × 10^9/l, and severe localised swelling extending proximally up a limb within 2–4 hours of the bite occurring.

A Previous anaphylaxis to antivenom

Previous anaphylaxis to antivenom is of course a contraindication to future use.

B History of ischaemic heart disease

ECG changes in response to a viper bite are an indication for antivenom, but a history of ischaemic heart disease per se is not.

C Visible puncture mark at the bite site

Although this indicates that a bite has occurred, it does not necessarily relate to the amount of venom injected, nor is it indicative of the symptoms.

D History of asthma

Most patients suffer a vascular type reaction to an adder bite, including problems with haemostasis and localised limb swelling. A history of asthma is not an indication or contra-indication to antivenom administration.

A 63-year-old woman is admitted with breathlessness. She has a background of diabetes.

A chest X-ray reveals a left-sided airspace infiltrates. She is commenced on antibiotics for a community-acquired pneumonia.

After 72 h, the patient has not responded to the antibiotics, both temperature and CRP are still raised, and her sputum has grown Nocardia asteroides.

What is the most appropriate antibiotic to use?

- A Trimethoprim
- B Ciprofloxacin
- C Sulphadiazine
- D Chloramphenicol
- E Gentamicin

6502

Question 35 of 128

C Sulphadiazine

Nocardia asteroides is an actinomycete infection responsible for pneumonia and cerebral abscess formation in the immunocompromised. Sulphonamides are the intervention of choice. These antibiotics act as inhibitors of bacterial dihydropteroate synthetase. Alternative antimicrobial agents with activity against *Nocardia* include amikacin, imipenem, meropenem, ceftriaxone, cefotaxime, minocycline, moxifloxacin, levofloxacin, linezolid, tigecycline, and amoxicillin-clavulanic acid.

E Gentamicin

Nocardia asteroides tends to be resistant to gentamicin, preventing it from being a treatment option here.

A Trimethoprim

Although trimethoprim is a component of co-trimoxazole, used as the first line therapy for Nocardia in the US, the benefit of the trimethoprim component of the drug is unclear.

B Ciprofloxacin

Next generation quinolones such as levofloxacin and moxifloxacin are preferred to ciprofloxacin for the treatment of Nocardia infection.

D Chloramphenicol

Chloramphenicol was a preferred agent for treating Nocardia until the 1990's, but is now considered when resistance to other options is identified

Figure 2. Tracking subcutaneous wounds after initial debridement.

locardia infection. Causes, symptoms ...
rugline.org

Nocardiosis: Clinical and Pathological ...
intechopen.com

Dermato
emedicin

Nocardiosis - Causes, Symptoms ...
primehealthchannel.com

oil-acquired cutaneous nocardiosis on ...
ovepress.com

Sporotrichoid Skin Infection Caused ...
mdpi.com

dissemi
scielo.br

ungal Infections: Nocardiosis ...
he-dermatologist.com

Cutaneous and Lymphocutaneous Nocardiosis

Patient Case Cutaneous Nocardia

1: Photograph showing right
ndibular and parotid abscess by
oides.

andibular and parotid abscess due to Nocardia ...

ght. Learn more

Figure 1: Right side submandibular swelling extending through the midline to involve the left submandibular area which is typical of Ludwig's angina in a 12 years old male.

A 48-year-old man is being managed on the HDU for severe hypertension associated with left ventricular failure and is currently being treated with intravenous (iv) sodium nitroprusside. His blood pressure (BP) is now 145/80 mmHg, his pulse 75/min and regular and he is improving. You are called back to see him a few hours later, just after the nursing shift change, because he has become acutely confused, short of breath and is complaining of central chest pain, abdominal pain and vomiting.

On examination his BP is now 100/60 mmHg, with pulse 90/min and regular.

Investigations:

Hb	12.1 g/dl
WCC	5.7 × 10^9/l
PLT	201 × 10^9/l
Na^+	140 mmol/l
K^+	4.5 mmol/l
Creatinine	160 µmol/l
pH	7.1
ECG	Widespread ST depression consistent with myocardial ischaemia

Given the suspected diagnosis, which of the following is the most appropriate treatment?

A IV GTN

B IV heparin

C IV dicobalt edetate

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On examination his BP is now 100/60 mmHg, with pulse 90/min and regular.

Investigations:

Hb	12.1 g/dl
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Creatinine	160 µmol/l
pH	7.1
ECG	Widespread ST depression consistent with myocardial ischaemia

Given the suspected diagnosis, which of the following is the most appropriate treatment?

A	IV GTN
B	IV heparin
C	IV dicobalt edetate
D	IV diamorphine
E	IV TPA

A IV GTN

Although there is obvious myocardial ischaemia, it's related here to cyanide poisoning; as such, IV GTN won't improve cardiac ischaemia and by dropping blood pressure may actually worsen it.

B IV heparin

Whilst anticoagulation is indicated where there is coronary artery occlusion, that isn't the case here and it won't improve outcomes.

D IV diamorphine

Pain related to ischaemia here should resolve once the cyanide antidote is administered.

E IV TPA

Thrombolysis is indicated for massive PE and for ST-elevation myocardial infarction where PCI is unavailable. Neither of those situations is present here.

A 34-year-old woman, who is eight weeks pregnant, comes in after an overdose of white tablets and is unable to remember how many she took. She refuses to wait for the results of her initial blood tests and leaves hospital, only to come back after a few hours complaining of feeling faint. At this point, her investigations are repeated. Salicylate levels are 4 mmol/l on the initial sample and 1.2 mmol/l on the subsequent one.

Investigations:

FBC, U&E, LFT	Normal
Initial ABG pH	7.6
$pa(CO_2)$	2.0 kPa
HCO_3^-	24 mmol/l

Repeat arterial blood gas (ABG) following return:

pH	7.35
$pa(CO_2)$	3.0 kPa
HCO_3^-	12 mmol/l

What metabolic abnormality is seen on first presentation?

A Metabolic acidosis

B Metabolic alkalosis

C Respiratory acidosis

D Respiratory alkalosis

E Mixed Metabolic and respiratory acidosis

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Repeat arterial blood gas (ABG) following return:

pH	7.35
pa(CO_2)	3.0 kPa
HCO_3^-	12 mmol/l

What metabolic abnormality is seen on first presentation?

Your answer was correct

A	Metabolic acidosis
B	Metabolic alkalosis
C	Respiratory acidosis

Rana Alnasser's screen

D Respiratory alkalosis

The elevated pH with low CO_2 and normal HCO_3 seen here is consistent with a respiratory alkalosis, the initial presentation of aspirin overdose.

A Metabolic acidosis

By the time the patient re-presents, the second blood gas illustrates a metabolic acidosis with partial compensation, commonly known as the third stage of aspirin overdose.

B Metabolic alkalosis

The bicarbonate in the normal range effectively rules out a metabolic alkalosis here.

C Respiratory acidosis

A respiratory acidosis is associated with an elevated CO_2, which isn't seen here. An isolated respiratory acidosis is seen in respiratory failure due to COPD or acute lower respiratory tract infection, and in overdose of opiates or benzodiazepines.

E Mixed Metabolic and respiratory acidosis

In a mixed metabolic and respiratory acidosis, the bicarbonate is low and the CO_2 is elevated, which isn't the picture reported here. A mixed metabolic and respiratory acidosis may be seen after events such as a myocardial infarction, where there is cardiac failure and co-existent decreased tissue perfusion.

Question 38 of 128

A 62-year-old woman presents to the surgery for follow-up after attending the Emergency Department with a left Colles fracture. She has a history of severe oesophagitis, for which she takes 40 mg omeprazole, a previous lumbar spine fracture, and a deep vein thrombosis on hormone replacement therapy (HRT) some 12 years earlier. She is interested in prophylaxis against osteoporosis.

Investigations:

Hb	13.1 g/dl
WCC	6.2 × 10^9/l
PLT	210 × 10^9/l
Na^+	139 mmol/l
K^+	4.9 mmol/l
Creatinine	130 μmol/l
T score	-4.2

Which of the following is the most appropriate therapy?

A	Calcium and vitamin D
B	Raloxifene
C	Etidronate
D	Strontium
E	Teriparatide

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E Teriparatide

Teriparatide is a synthetic PTH analogue, given as a once a day subcutaneous injection. It is one of the few treatments for osteoporosis which is recognised to increase osteoblast activity. NICE guidance suggests that teriparatide is appropriate for patients with a T score of <4.0 who have two or more fractures.

D Strontium

Strontium is associated with increased cardiovascular events and potentially with increased risk of venous thromboembolism. As such it is reserved for patients where other options for treating osteoporosis are unsuitable.

A Calcium and vitamin D

Given the very low T score seen here, it is not appropriate to treat with calcium and vitamin D alone.

B Raloxifene

Raloxifene is a selective oestrogen receptor modulator. Although it is not associated with oesophagitis, it is less effective at preserving BMD than bisphosphonates, and is associated with increased risk of venous thromboembolism. As such it is not an appropriate option here.

C Etidronate

Although etidronate can be given in larger doses with decreased dosing frequency, it still has the propensity to cause oesophagitis, and should therefore be avoided here.

E Teriparatide

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C Etidronate

Although etidronate can be given in larger doses with decreased dosing frequency, it still has the propensity to cause oesophagitis, and should therefore be avoided here.

A 30-year-old farmer is admitted with blurring of vision for the past 10 h; 4 h ago he noticed double vision and 2 h ago he noticed weakness of his limbs. His wife noticed that his voice had become hoarse and he was choking on and off.

She remembered that her husband had initially vomited several times after having had his favourite home-cured ham, a day ago.

On examination, he was alert and had a hoarse and nasal voice. BP was 125/72 mmHg, pulse 82/min, respiratory rate 18/min. A right-sided ptosis and bilateral lateral recti weakness were evident. Pupils were 3 mm and unreactive to light on both sides. Facial expression was normal and the gag reflex was also normal. He had a generalised weakness of his limbs and tendon reflexes were absent. Sensation was intact.

What is the most likely diagnosis?

A	Guillain-Barré syndrome
B	Lambert-Eaton syndrome
C	Myasthenia gravis
D	Botulism
E	Lafora body disease

Question 39 of 128

She remembered that her husband had initially vomited several times after having had his favourite home-cured ham, a day ago.

On examination, he was alert and had a hoarse and nasal voice. BP was 125/72 mmHg, pulse 82/min, respiratory rate 18/min. A right-sided ptosis and bilateral lateral recti weakness were evident. Pupils were 3 mm and unreactive to light on both sides. Facial expression was normal and the gag reflex was also normal. He had a generalised weakness of his limbs and tendon reflexes were absent. Sensation was intact.

What is the most likely diagnosis?

Your answer was correct

A Guillain-Barré syndrome

B Lambert-Eaton syndrome

C Myasthenia gravis

D Botulism

E Lafora body disease

Explanation

D Botulism

Botulism is a rare form of food-borne disease caused by

Explanation

D Botulism

Botulism is a rare form of food-borne disease caused by the exotoxin of *Cl. botulinum*. It usually occurs from consumption of home-preserved food and vegetables. It is also rarely seen in injecting drug abusers. The toxin acts at the presynaptic endings of the neuromuscular junction and interferes with the release of acetylcholine. Symptoms usually appear within 12–36 h of ingestion of the contaminated food. In most patients the initial symptoms are anorexia, nausea and vomiting. This is followed by blurred vision, diplopia due to oculomotor muscle weakness. Pupils are often unreactive, differentiating this disease from myasthenia gravis, and mydriasis may be present. Subsequently the patient develops bulbar involvement followed by progressive weakness of the face, neck, trunk, limbs and respiratory muscles in quick succession. It is not unusual for the gag reflex to be retained, as in the present scenario. Clinical diagnosis is confirmed on repetitive nerve stimulation test, which shows a progressive increase in amplitude of the potentials. Treatment is by the use of the trivalent antiserum and guanidine hydrochloride (although this is unproven in the clinical trial setting).

A Guillain-Barré syndrome

This syndrome is associated with ascending paralysis rather than the central symptoms of muscle weakness appearing first, as is seen here. The Miller-Fisher variant does, however, present with central weakness first and, in this case nerve conduction studies/EMG may be helpful

B Lambert-Eaton syndrome

Lambert-Eaton syndrome presents with gradual-onset muscle weakness over a number of weeks and is associated with underlying bronchial carcinoma.

C Myasthenia gravis

This is associated with gradual-onset proximal myopathy and is associated with other underlying autoimmune conditions.

E Lafora body disease

Lafora body disease is inherited progressive myoclonic epilepsy.

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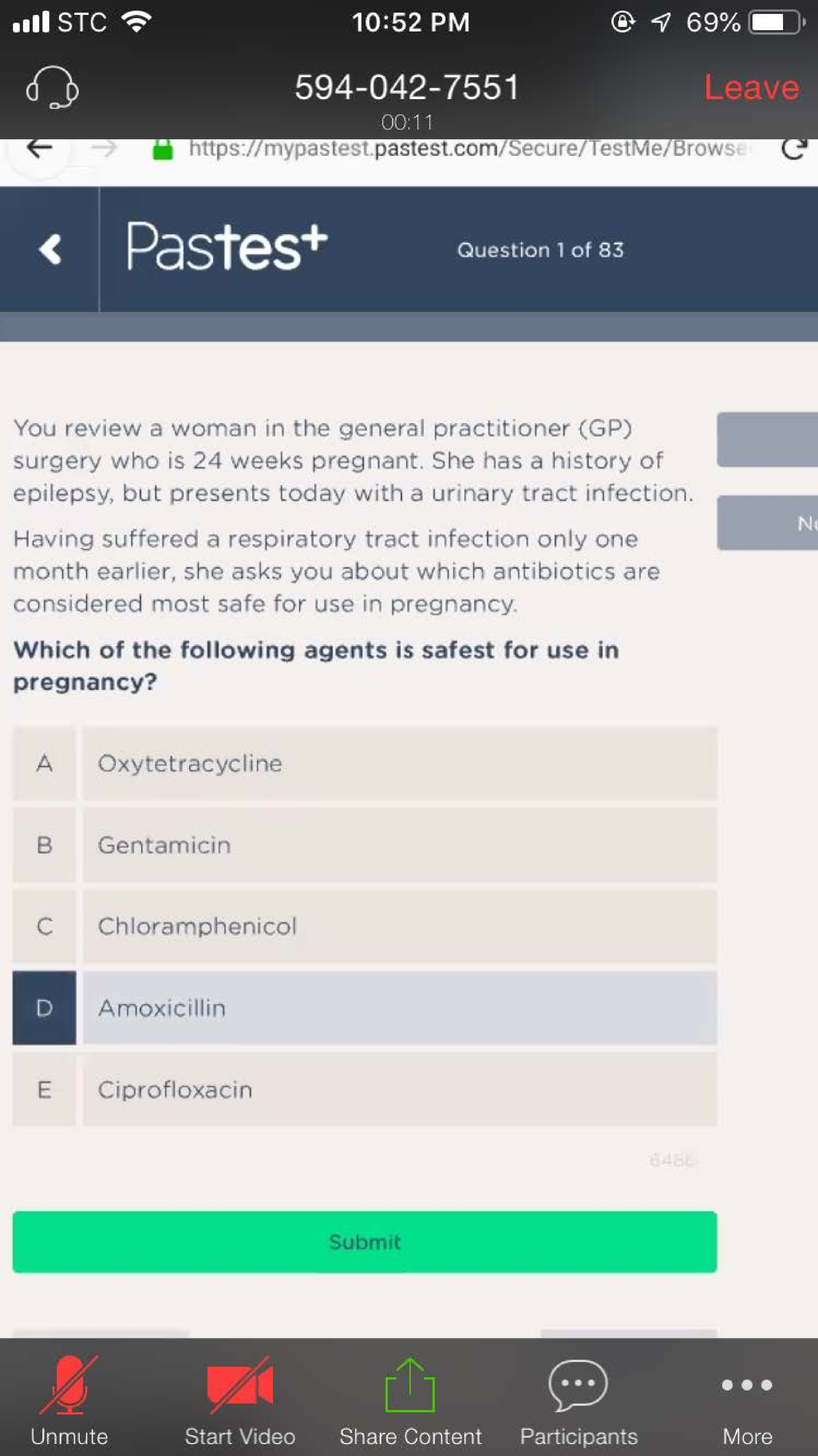

You review a woman in the general practitioner (GP) surgery who is 24 weeks pregnant. She has a history of epilepsy, but presents today with a urinary tract infection.

Having suffered a respiratory tract infection only one month earlier, she asks you about which antibiotics are considered most safe for use in pregnancy.

Which of the following agents is safest for use in pregnancy?

A Oxytetracycline

B Gentamicin

C Chloramphenicol

D Amoxicillin

E Ciprofloxacin

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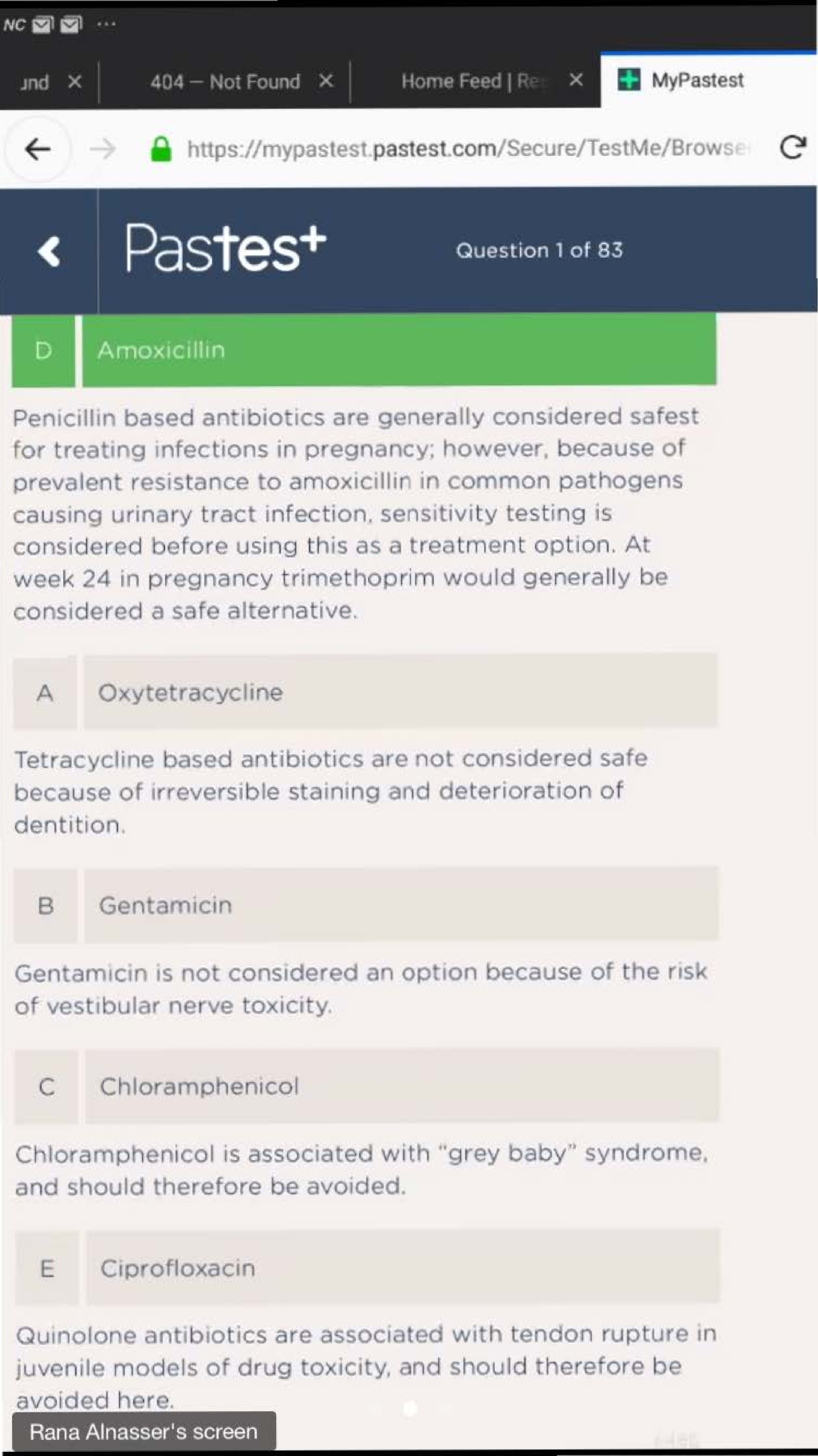


D Amoxicillin

Penicillin based antibiotics are generally considered safest for treating infections in pregnancy; however, because of prevalent resistance to amoxicillin in common pathogens causing urinary tract infection, sensitivity testing is considered before using this as a treatment option. At week 24 in pregnancy trimethoprim would generally be considered a safe alternative.

A Oxytetracycline

Tetracycline based antibiotics are not considered safe because of irreversible staining and deterioration of dentition.

B Gentamicin

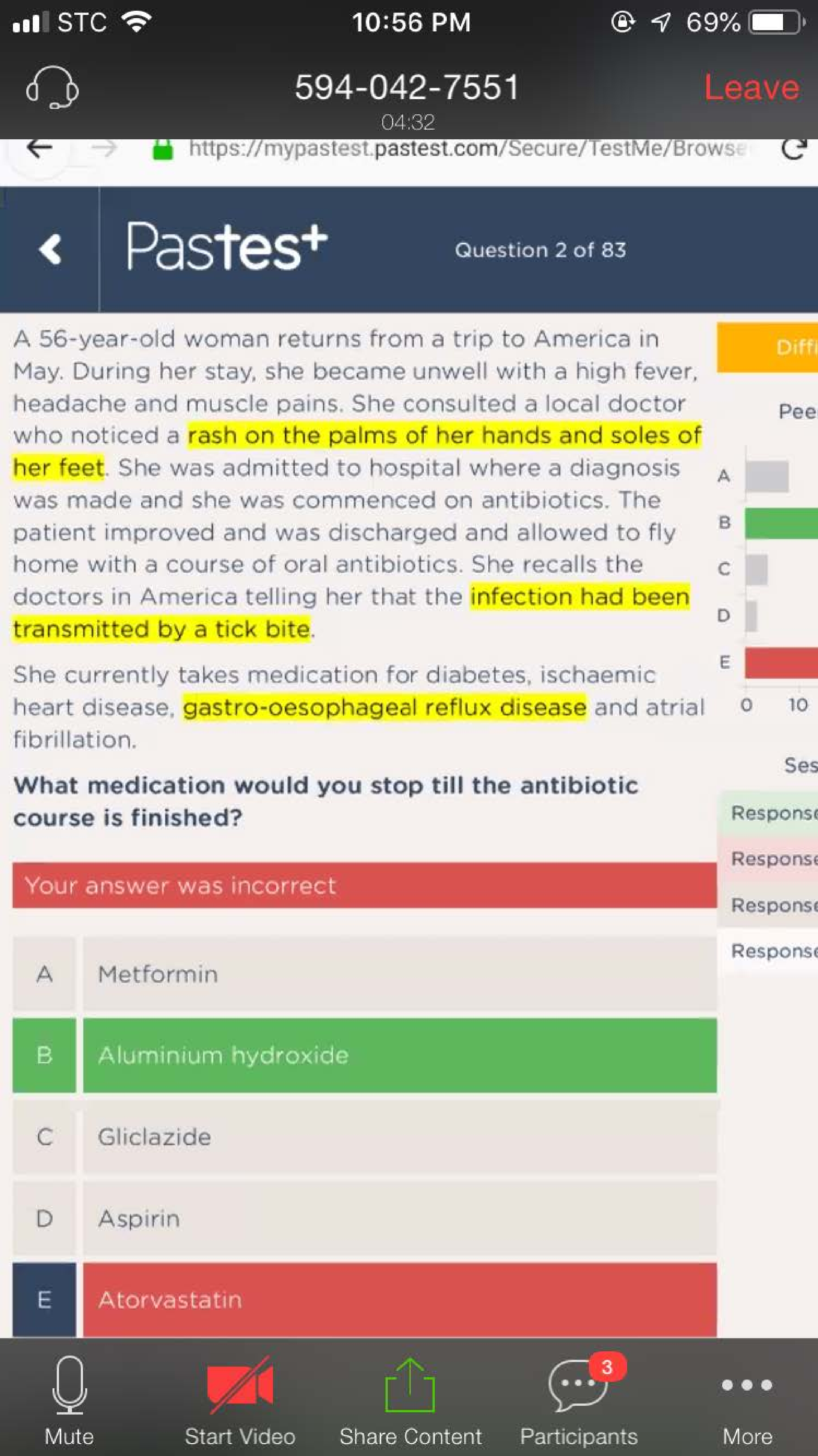
Gentamicin is not considered an option because of the risk of vestibular nerve toxicity.

C Chloramphenicol

Chloramphenicol is associated with “grey baby” syndrome, and should therefore be avoided.

E Ciprofloxacin

Quinolone antibiotics are associated with tendon rupture in juvenile models of drug toxicity, and should therefore be avoided here.



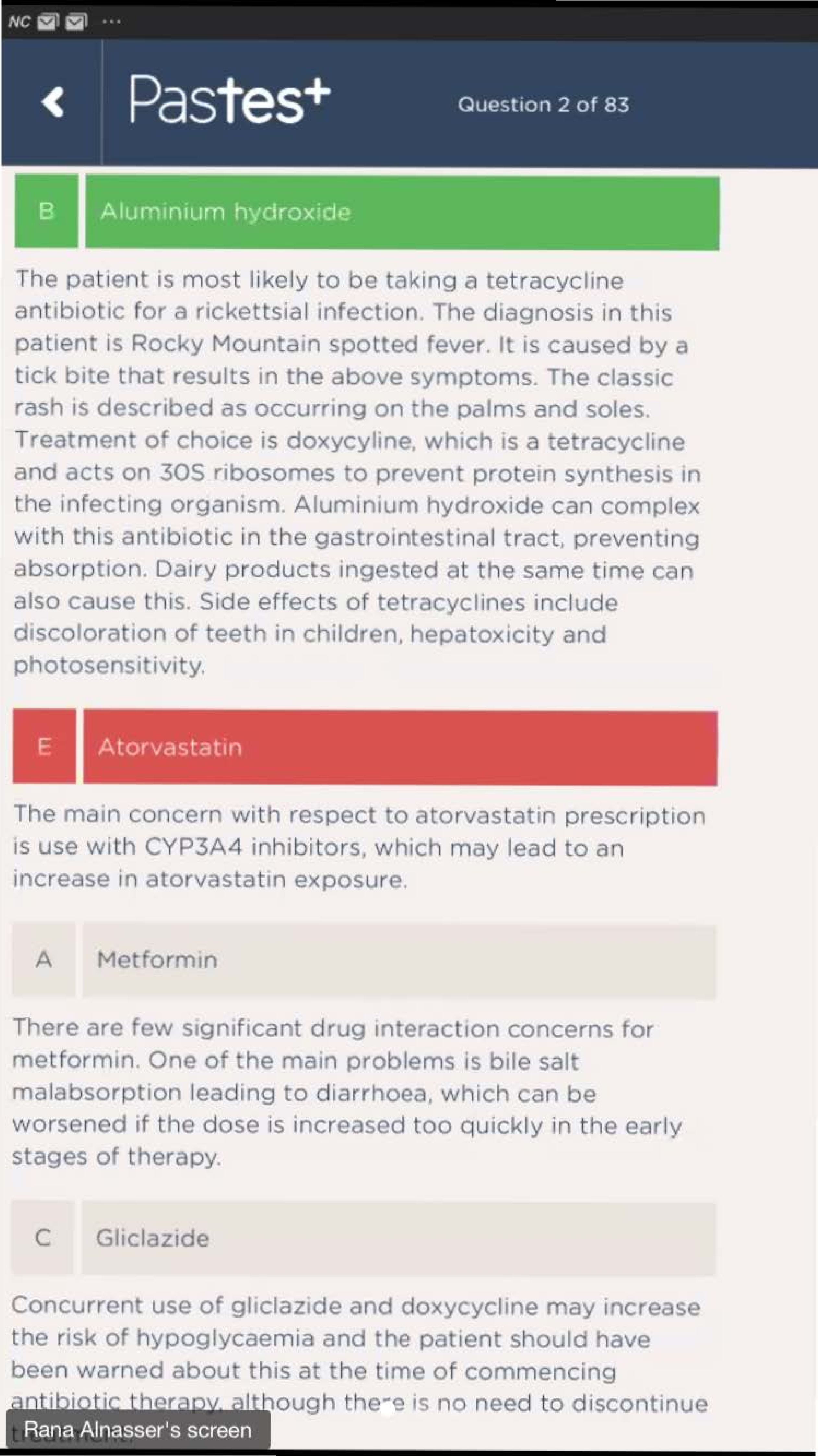
A 56-year-old woman returns from a trip to America in May. During her stay, she became unwell with a high fever, headache and muscle pains. She consulted a local doctor who noticed a rash on the palms of her hands and soles of her feet. She was admitted to hospital where a diagnosis was made and she was commenced on antibiotics. The patient improved and was discharged and allowed to fly home with a course of oral antibiotics. She recalls the doctors in America telling her that the infection had been transmitted by a tick bite.

She currently takes medication for diabetes, ischaemic heart disease, gastro-oesophageal reflux disease and atrial fibrillation.

What medication would you stop till the antibiotic course is finished?

Your answer was incorrect

A	Metformin
B	Aluminium hydroxide
C	Gliclazide
D	Aspirin
E	Atorvastatin



B Aluminium hydroxide

The patient is most likely to be taking a tetracycline antibiotic for a rickettsial infection. The diagnosis in this patient is Rocky Mountain spotted fever. It is caused by a tick bite that results in the above symptoms. The classic rash is described as occurring on the palms and soles. Treatment of choice is doxycyline, which is a tetracycline and acts on 30S ribosomes to prevent protein synthesis in the infecting organism. Aluminium hydroxide can complex with this antibiotic in the gastrointestinal tract, preventing absorption. Dairy products ingested at the same time can also cause this. Side effects of tetracyclines include discoloration of teeth in children, hepatoxicity and photosensitivity.

E Atorvastatin

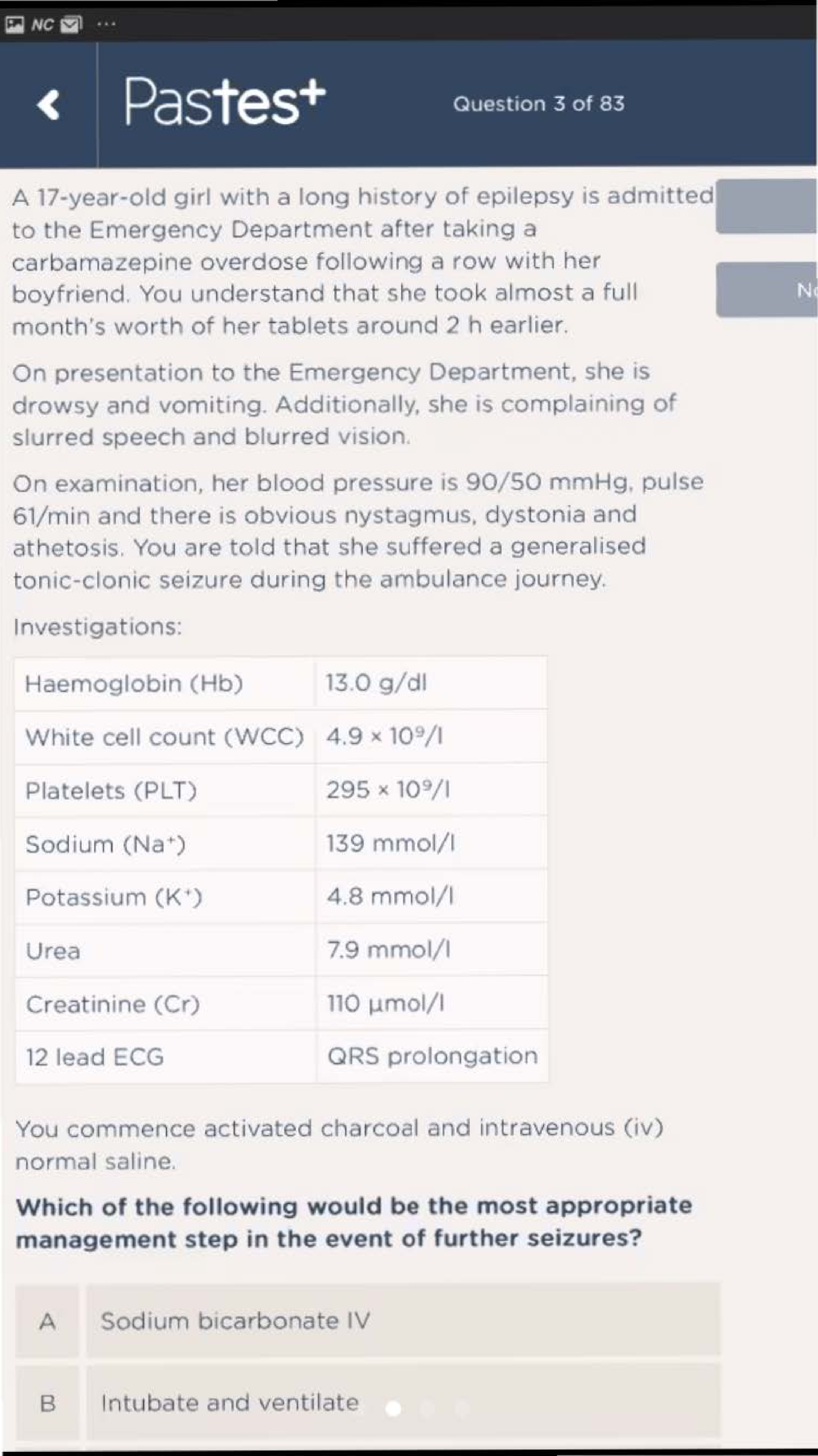
The main concern with respect to atorvastatin prescription is use with CYP3A4 inhibitors, which may lead to an increase in atorvastatin exposure.

A Metformin

There are few significant drug interaction concerns for metformin. One of the main problems is bile salt malabsorption leading to diarrhoea, which can be worsened if the dose is increased too quickly in the early stages of therapy.

C Gliclazide

Concurrent use of gliclazide and doxycycline may increase the risk of hypoglycaemia and the patient should have been warned about this at the time of commencing antibiotic therapy, although there is no need to discontinue



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Question 3 of 83

A 17-year-old girl with a long history of epilepsy is admitted to the Emergency Department after taking a carbamazepine overdose following a row with her boyfriend. You understand that she took almost a full month's worth of her tablets around 2 h earlier.

On presentation to the Emergency Department, she is drowsy and vomiting. Additionally, she is complaining of slurred speech and blurred vision.

On examination, her blood pressure is 90/50 mmHg, pulse 61/min and there is obvious nystagmus, dystonia and athetosis. You are told that she suffered a generalised tonic-clonic seizure during the ambulance journey.

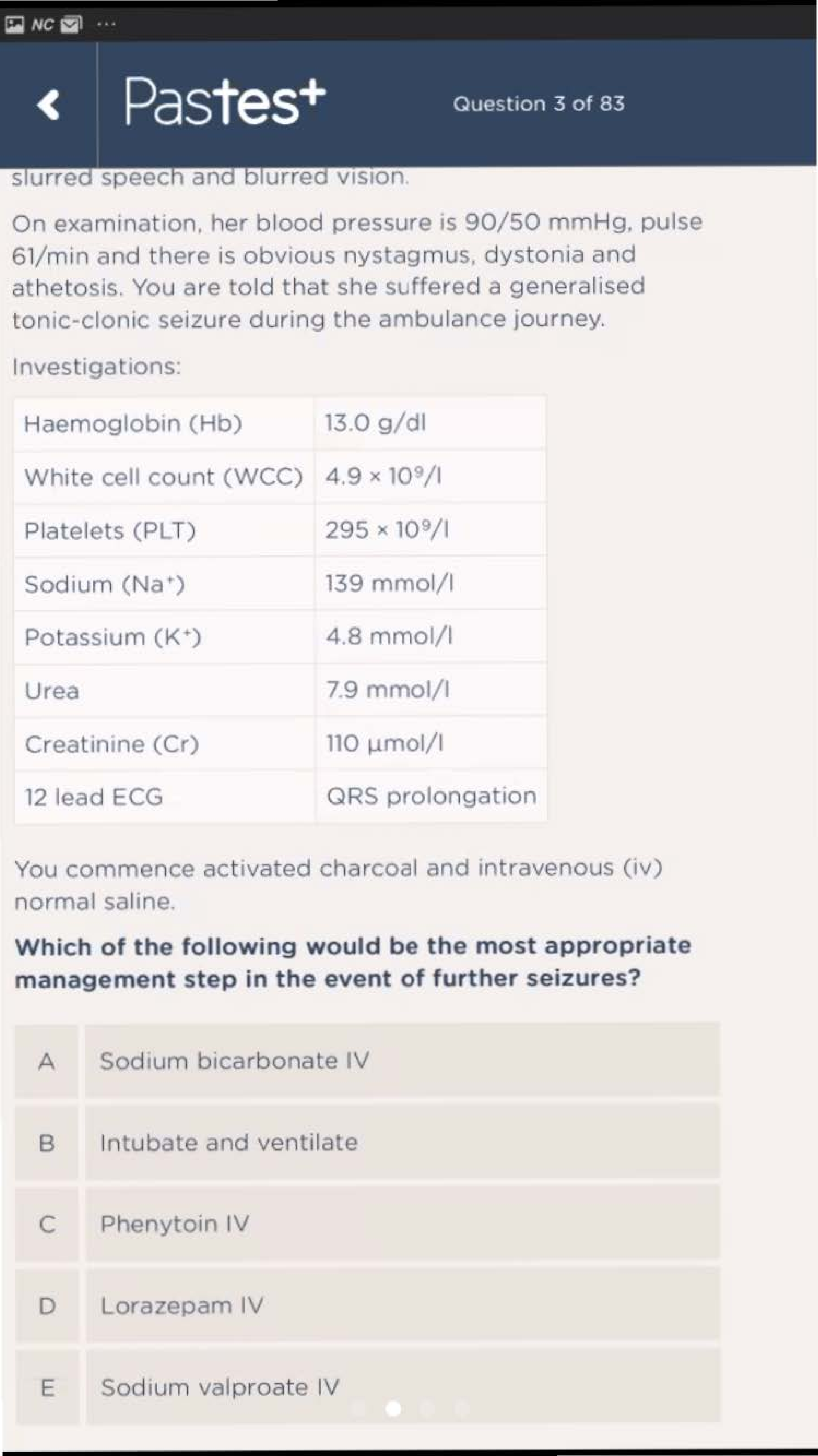
Investigations:

Haemoglobin (Hb)	13.0 g/dl
White cell count (WCC)	4.9 × 10^9/l
Platelets (PLT)	295 × 10^9/l
Sodium (Na^+)	139 mmol/l
Potassium (K^+)	4.8 mmol/l
Urea	7.9 mmol/l
Creatinine (Cr)	110 µmol/l
12 lead ECG	QRS prolongation

You commence activated charcoal and intravenous (iv) normal saline.

Which of the following would be the most appropriate management step in the event of further seizures?

A	Sodium bicarbonate IV
B	Intubate and ventilate



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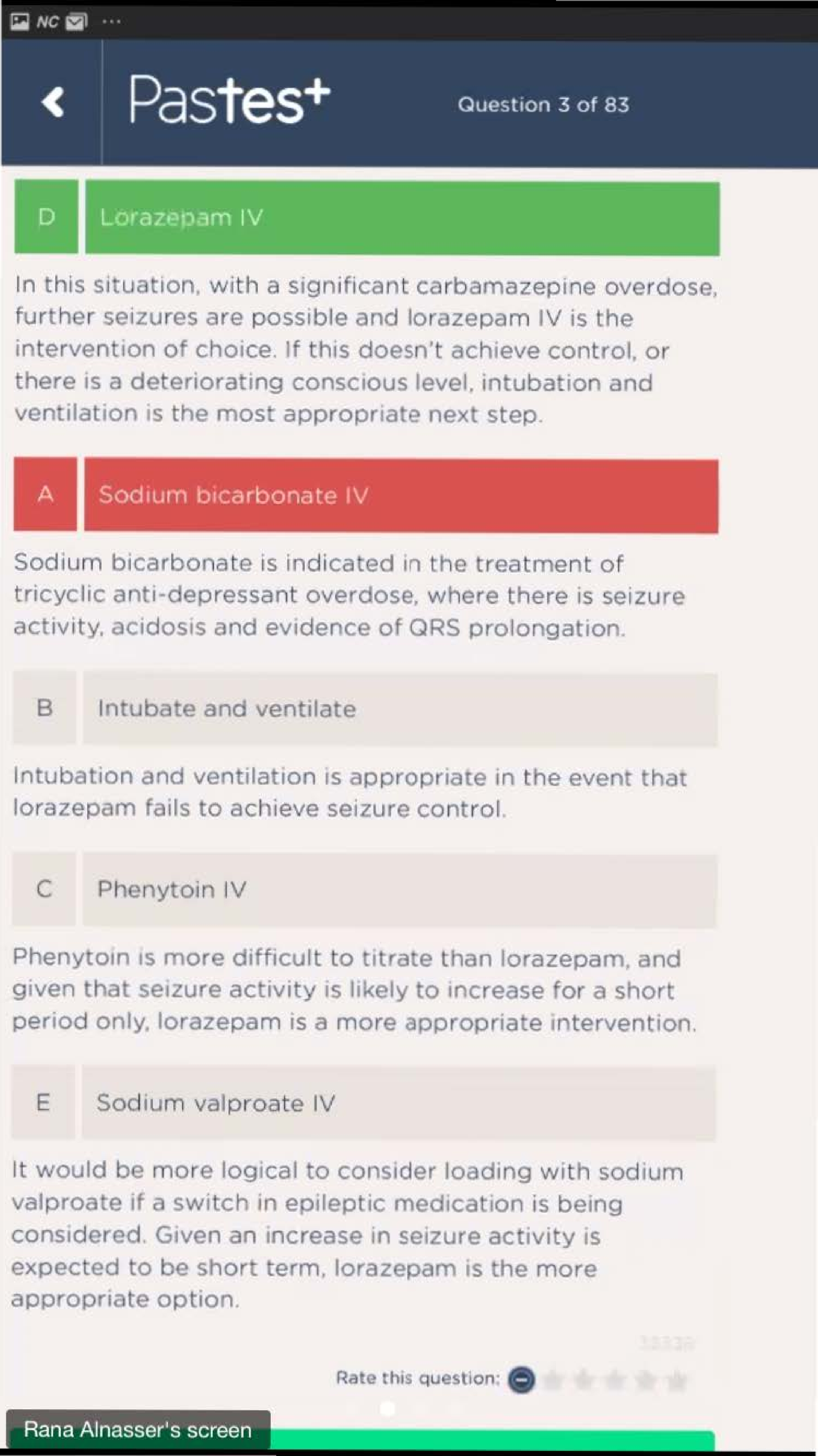
A Sodium bicarbonate IV

B Intubate and ventilate

C Phenytoin IV

D Lorazepam IV

E Sodium valproate IV



D Lorazepam IV

In this situation, with a significant carbamazepine overdose, further seizures are possible and lorazepam IV is the intervention of choice. If this doesn't achieve control, or there is a deteriorating conscious level, intubation and ventilation is the most appropriate next step.

A Sodium bicarbonate IV

Sodium bicarbonate is indicated in the treatment of tricyclic anti-depressant overdose, where there is seizure activity, acidosis and evidence of QRS prolongation.

B Intubate and ventilate

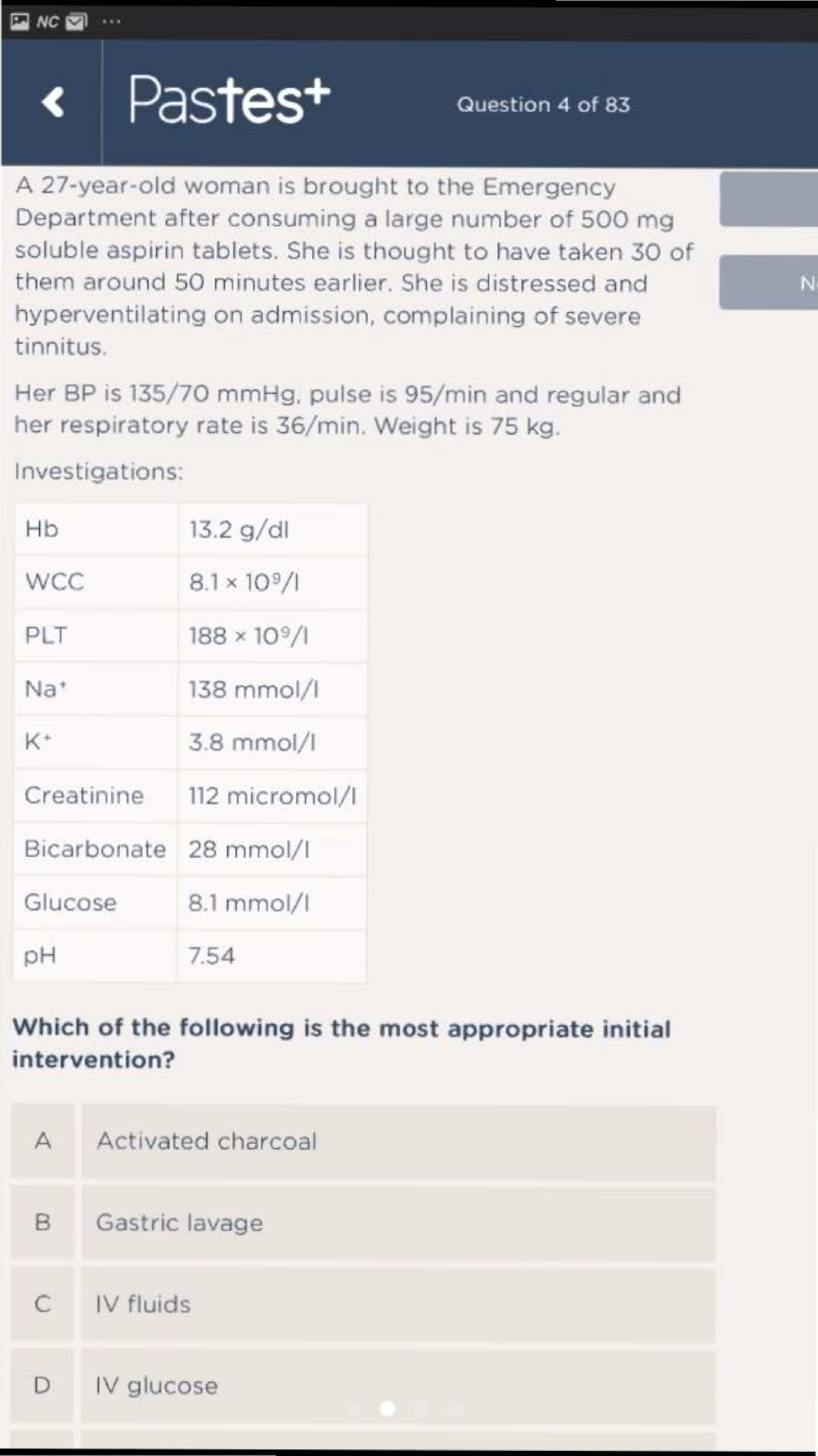
Intubation and ventilation is appropriate in the event that lorazepam fails to achieve seizure control.

C Phenytoin IV

Phenytoin is more difficult to titrate than lorazepam, and given that seizure activity is likely to increase for a short period only, lorazepam is a more appropriate intervention.

E Sodium valproate IV

It would be more logical to consider loading with sodium valproate if a switch in epileptic medication is being considered. Given an increase in seizure activity is expected to be short term, lorazepam is the more appropriate option.



A 27-year-old woman is brought to the Emergency Department after consuming a large number of 500 mg soluble aspirin tablets. She is thought to have taken 30 of them around 50 minutes earlier. She is distressed and hyperventilating on admission, complaining of severe tinnitus.

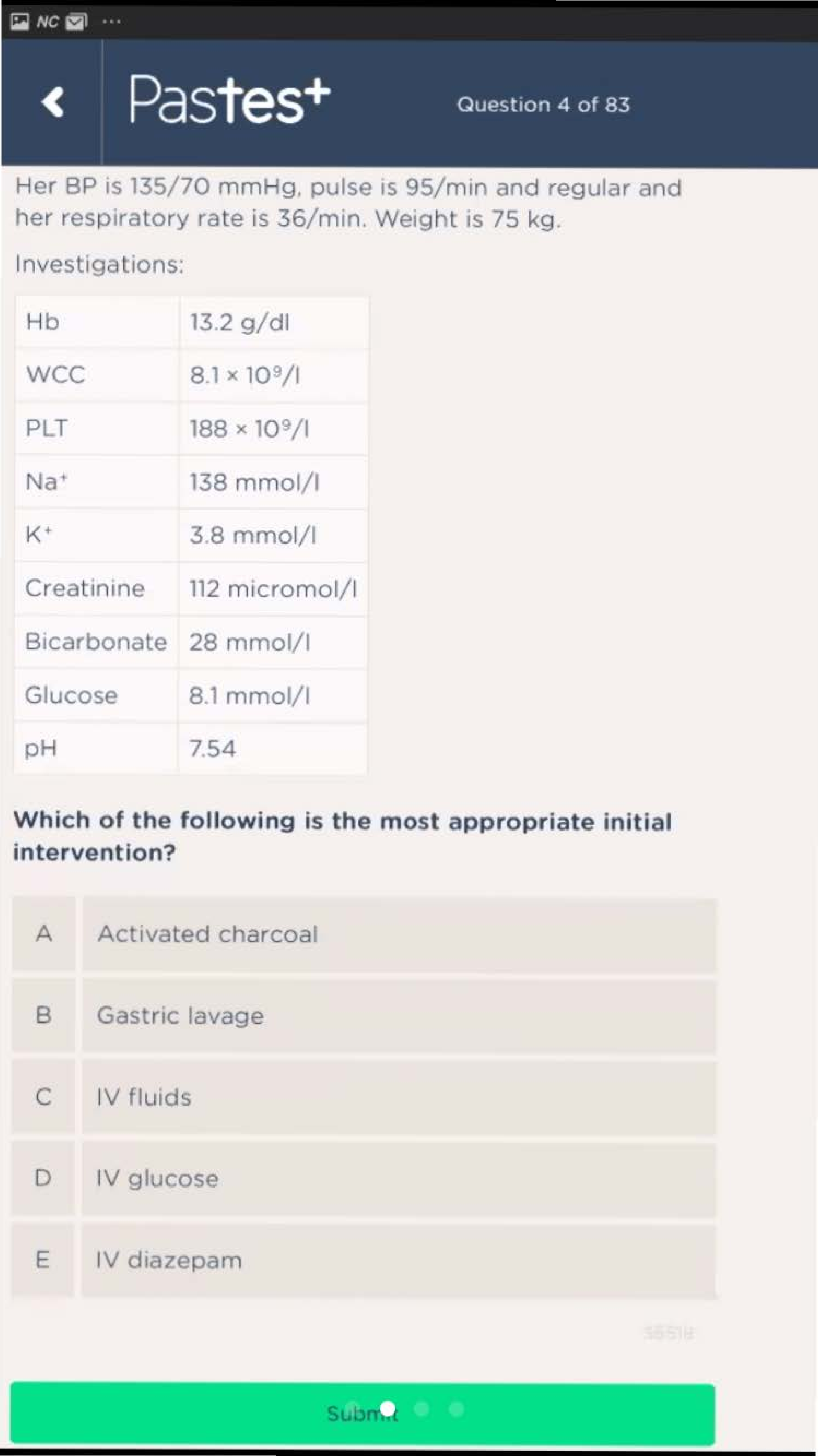
Her BP is 135/70 mmHg, pulse is 95/min and regular and her respiratory rate is 36/min. Weight is 75 kg.

Investigations:

Hb	13.2 g/dl
WCC	8.1×10^9/l
PLT	188×10^9/l
Na^+	138 mmol/l
K^+	3.8 mmol/l
Creatinine	112 micromol/l
Bicarbonate	28 mmol/l
Glucose	8.1 mmol/l
pH	7.54

Which of the following is the most appropriate initial intervention?

A	Activated charcoal
B	Gastric lavage
C	IV fluids
D	IV glucose



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Investigations:

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Na^+	138 mmol/l
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Creatinine	112 micromol/l
Bicarbonate	28 mmol/l
Glucose	8.1 mmol/l
pH	7.54

Which of the following is the most appropriate initial intervention?

A	Activated charcoal
B	Gastric lavage
C	IV fluids
D	IV glucose
E	IV diazepam

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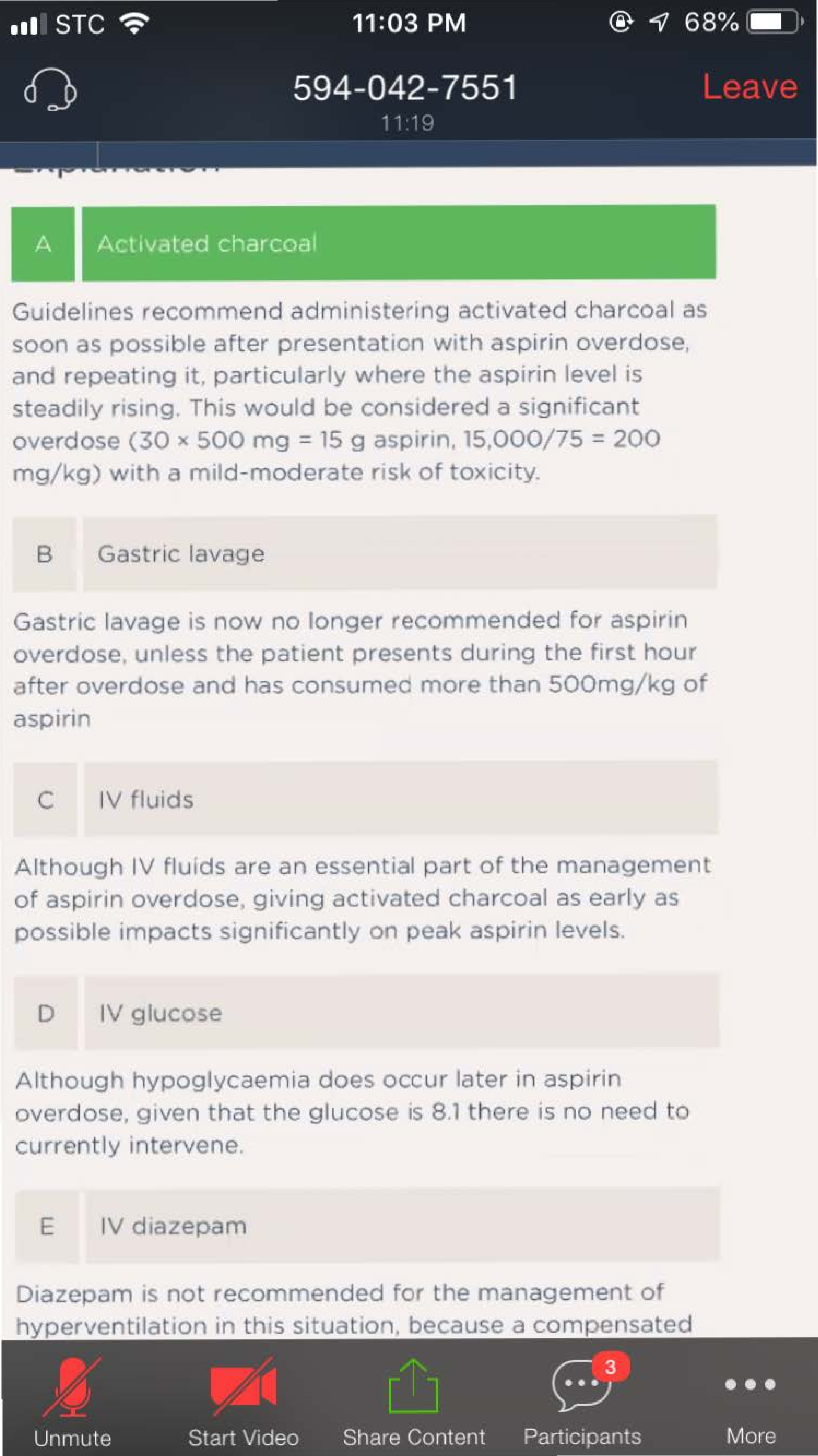


A Activated charcoal

Guidelines recommend administering activated charcoal as soon as possible after presentation with aspirin overdose, and repeating it, particularly where the aspirin level is steadily rising. This would be considered a significant overdose (30 × 500 mg = 15 g aspirin, 15,000/75 = 200 mg/kg) with a mild-moderate risk of toxicity.

B Gastric lavage

Gastric lavage is now no longer recommended for aspirin overdose, unless the patient presents during the first hour after overdose and has consumed more than 500mg/kg of aspirin

C IV fluids

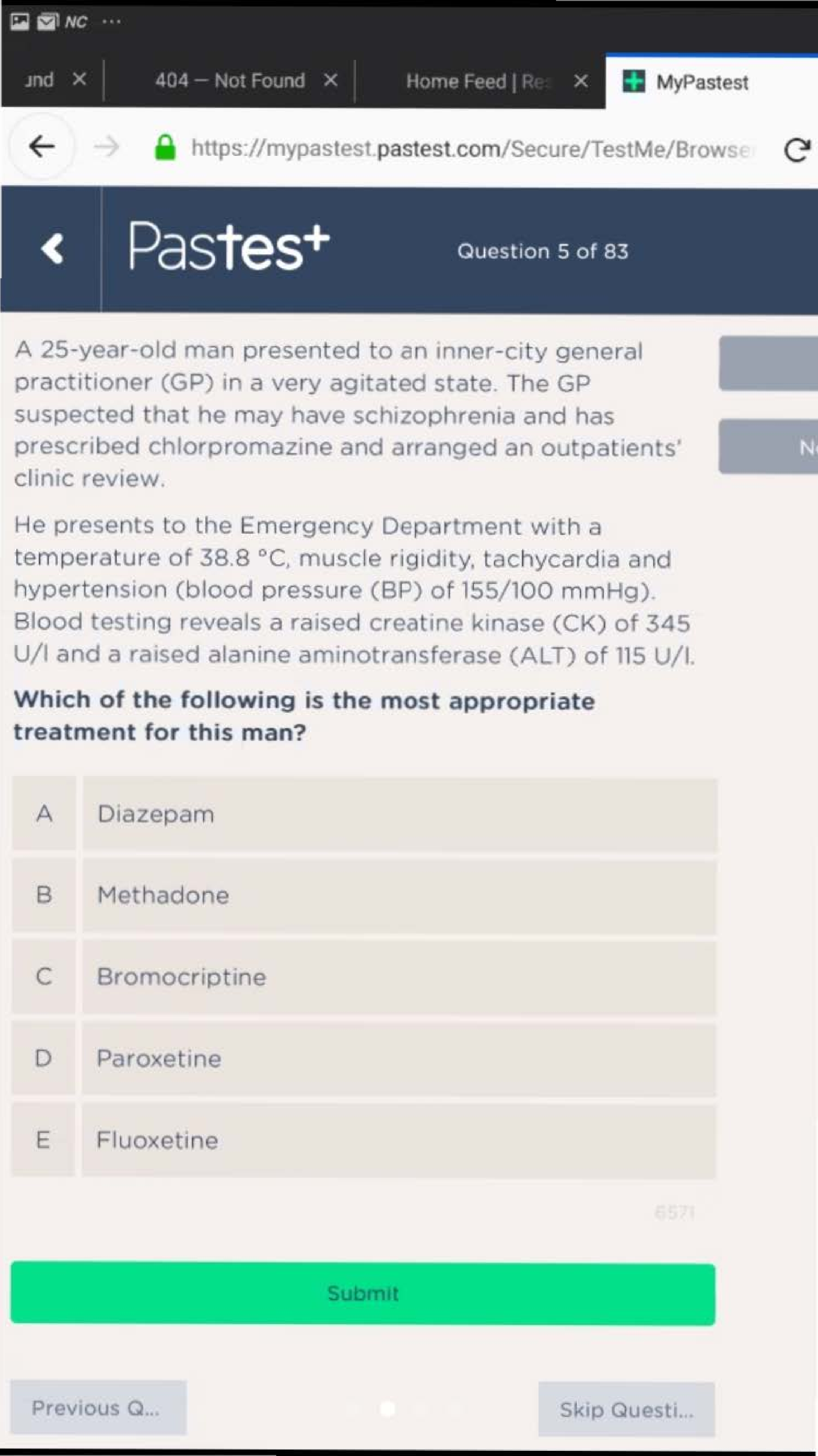
Although IV fluids are an essential part of the management of aspirin overdose, giving activated charcoal as early as possible impacts significantly on peak aspirin levels.

D IV glucose

Although hypoglycaemia does occur later in aspirin overdose, given that the glucose is 8.1 there is no need to currently intervene.

E IV diazepam

Diazepam is not recommended for the management of hyperventilation in this situation, because a compensated



A 25-year-old man presented to an inner-city general practitioner (GP) in a very agitated state. The GP suspected that he may have schizophrenia and has prescribed chlorpromazine and arranged an outpatients' clinic review.

He presents to the Emergency Department with a temperature of 38.8 °C, muscle rigidity, tachycardia and hypertension (blood pressure (BP) of 155/100 mmHg). Blood testing reveals a raised creatine kinase (CK) of 345 U/l and a raised alanine aminotransferase (ALT) of 115 U/l.

Which of the following is the most appropriate treatment for this man?

A Diazepam

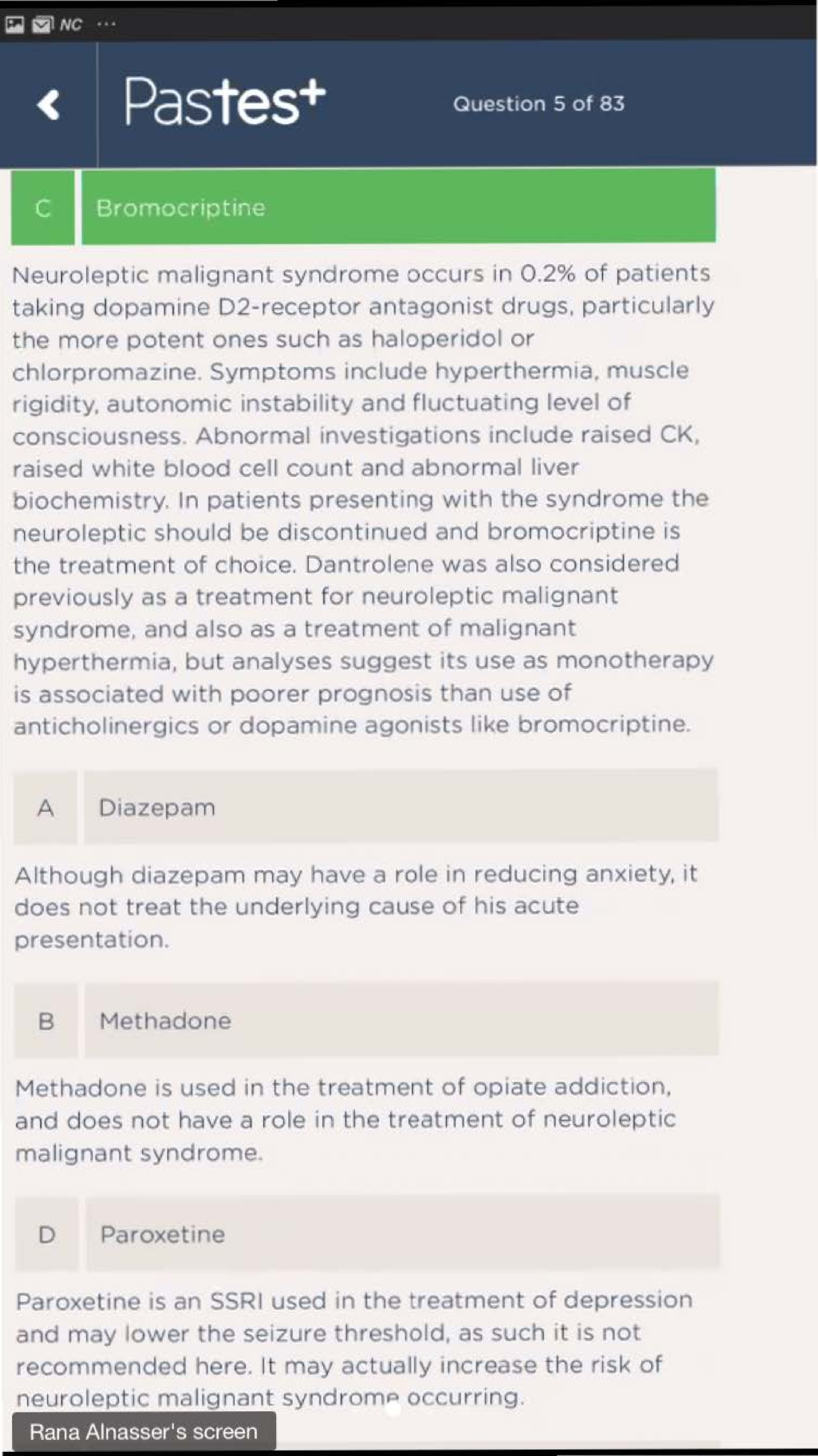
B Methadone

C Bromocriptine

D Paroxetine

E Fluoxetine

6571



C Bromocriptine

Neuroleptic malignant syndrome occurs in 0.2% of patients taking dopamine D2-receptor antagonist drugs, particularly the more potent ones such as haloperidol or chlorpromazine. Symptoms include hyperthermia, muscle rigidity, autonomic instability and fluctuating level of consciousness. Abnormal investigations include raised CK, raised white blood cell count and abnormal liver biochemistry. In patients presenting with the syndrome the neuroleptic should be discontinued and bromocriptine is the treatment of choice. Dantrolene was also considered previously as a treatment for neuroleptic malignant syndrome, and also as a treatment of malignant hyperthermia, but analyses suggest its use as monotherapy is associated with poorer prognosis than use of anticholinergics or dopamine agonists like bromocriptine.

A Diazepam

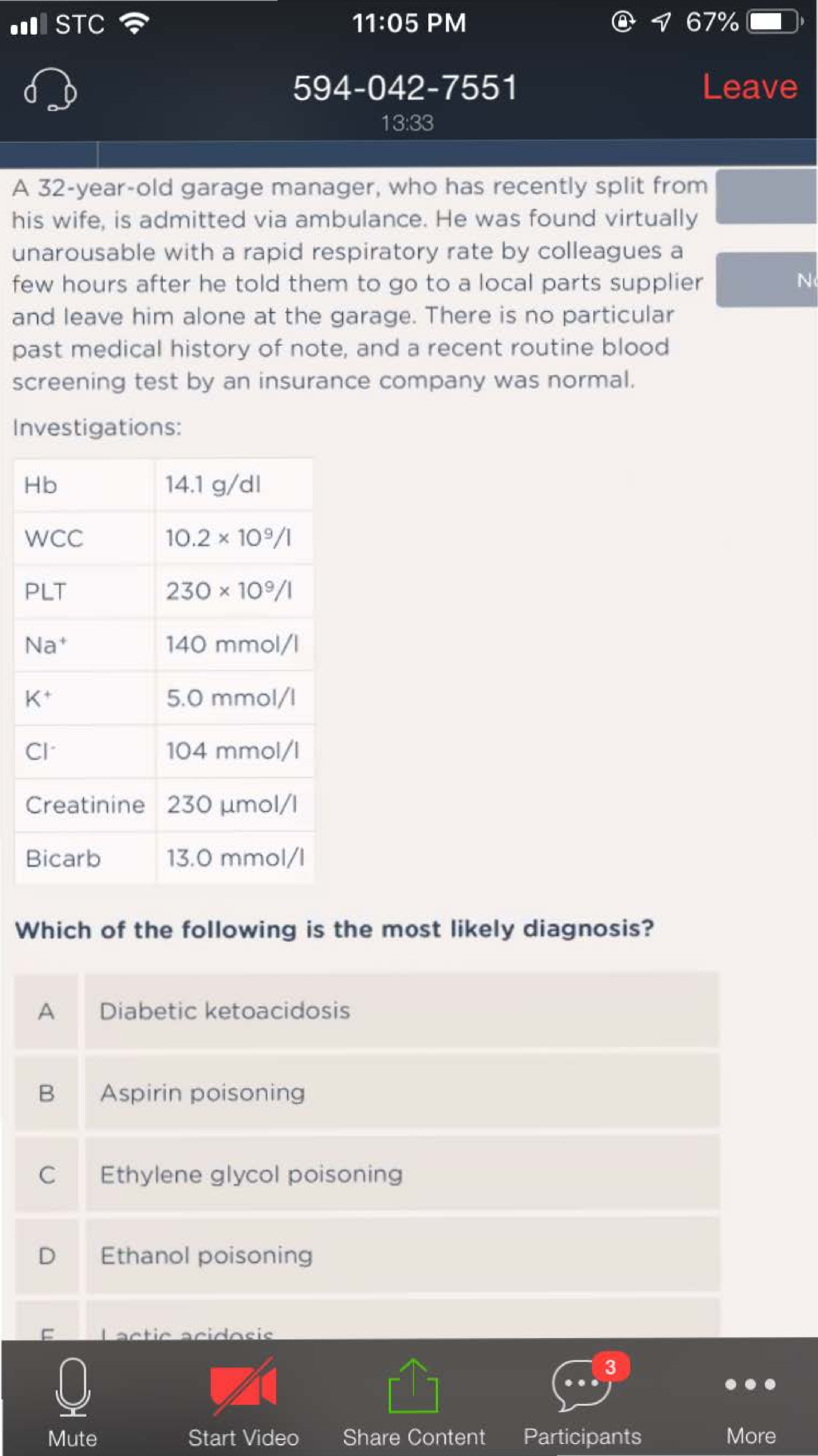
Although diazepam may have a role in reducing anxiety, it does not treat the underlying cause of his acute presentation.

B Methadone

Methadone is used in the treatment of opiate addiction, and does not have a role in the treatment of neuroleptic malignant syndrome.

D Paroxetine

Paroxetine is an SSRI used in the treatment of depression and may lower the seizure threshold, as such it is not recommended here. It may actually increase the risk of neuroleptic malignant syndrome occurring.



A 32-year-old garage manager, who has recently split from his wife, is admitted via ambulance. He was found virtually unarousable with a rapid respiratory rate by colleagues a few hours after he told them to go to a local parts supplier and leave him alone at the garage. There is no particular past medical history of note, and a recent routine blood screening test by an insurance company was normal.

Investigations:

Hb	14.1 g/dl
WCC	10.2 × 10^9/l
PLT	230 × 10^9/l
Na^+	140 mmol/l
K^+	5.0 mmol/l
Cl^-	104 mmol/l
Creatinine	230 µmol/l
Bicarb	13.0 mmol/l

Which of the following is the most likely diagnosis?

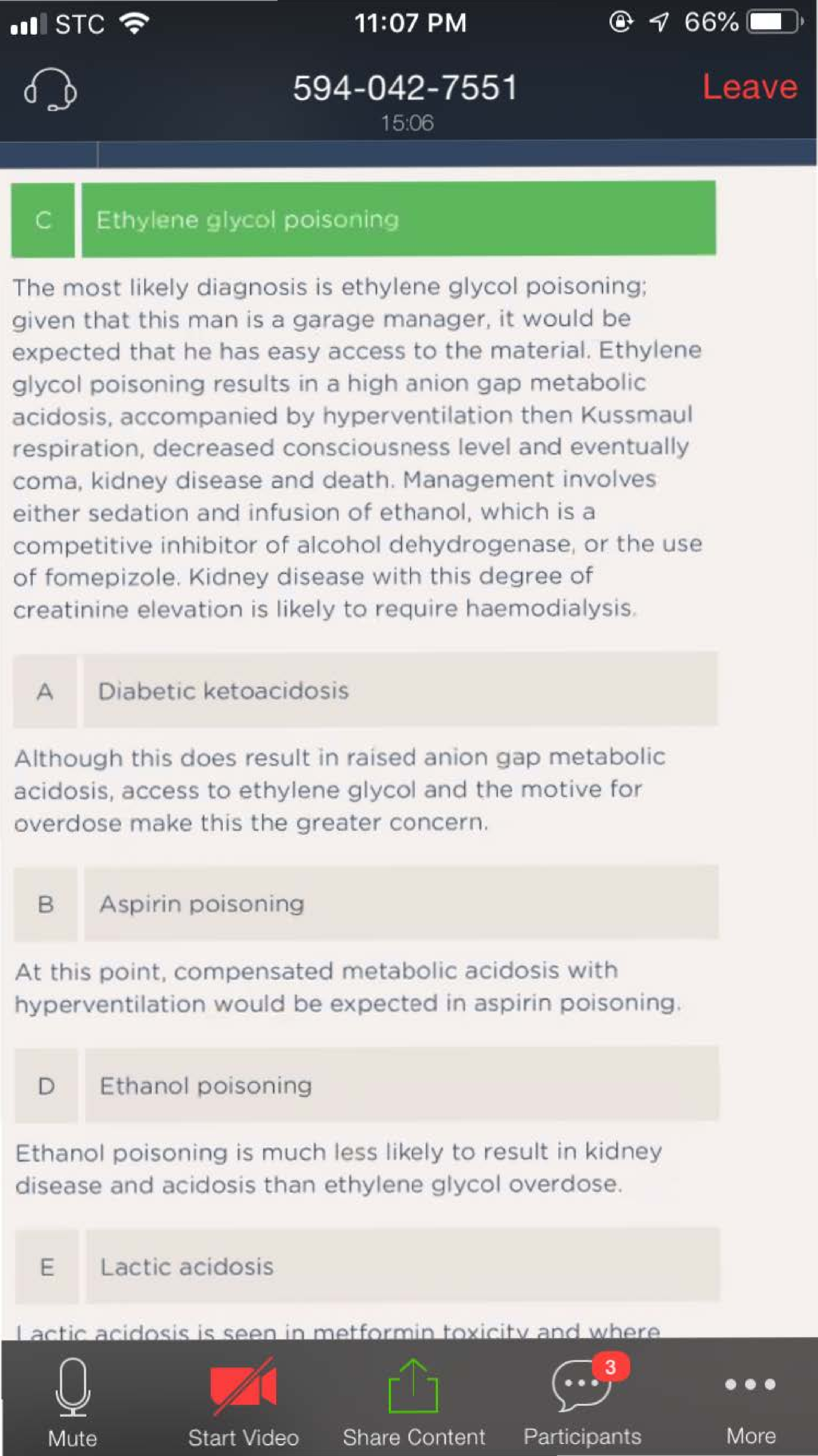
A Diabetic ketoacidosis

B Aspirin poisoning

C Ethylene glycol poisoning

D Ethanol poisoning

E Lactic acidosis



C Ethylene glycol poisoning

The most likely diagnosis is ethylene glycol poisoning; given that this man is a garage manager, it would be expected that he has easy access to the material. Ethylene glycol poisoning results in a high anion gap metabolic acidosis, accompanied by hyperventilation then Kussmaul respiration, decreased consciousness level and eventually coma, kidney disease and death. Management involves either sedation and infusion of ethanol, which is a competitive inhibitor of alcohol dehydrogenase, or the use of fomepizole. Kidney disease with this degree of creatinine elevation is likely to require haemodialysis.

A Diabetic ketoacidosis

Although this does result in raised anion gap metabolic acidosis, access to ethylene glycol and the motive for overdose make this the greater concern.

B Aspirin poisoning

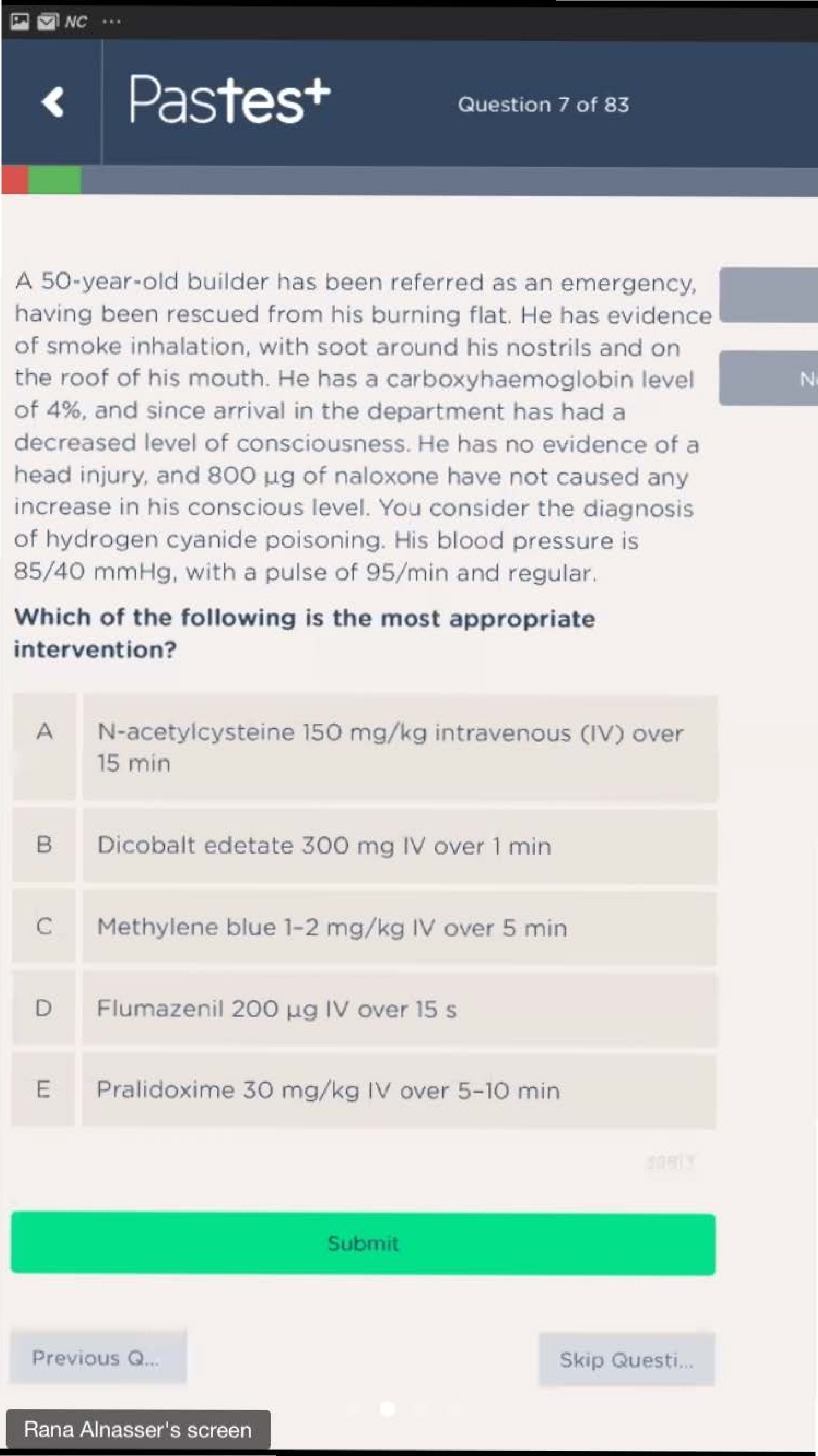
At this point, compensated metabolic acidosis with hyperventilation would be expected in aspirin poisoning.

D Ethanol poisoning

Ethanol poisoning is much less likely to result in kidney disease and acidosis than ethylene glycol overdose.

E Lactic acidosis

Lactic acidosis is seen in metformin toxicity and where



A 50-year-old builder has been referred as an emergency, having been rescued from his burning flat. He has evidence of smoke inhalation, with soot around his nostrils and on the roof of his mouth. He has a carboxyhaemoglobin level of 4%, and since arrival in the department has had a decreased level of consciousness. He has no evidence of a head injury, and 800 µg of naloxone have not caused any increase in his conscious level. You consider the diagnosis of hydrogen cyanide poisoning. His blood pressure is 85/40 mmHg, with a pulse of 95/min and regular.

Which of the following is the most appropriate intervention?

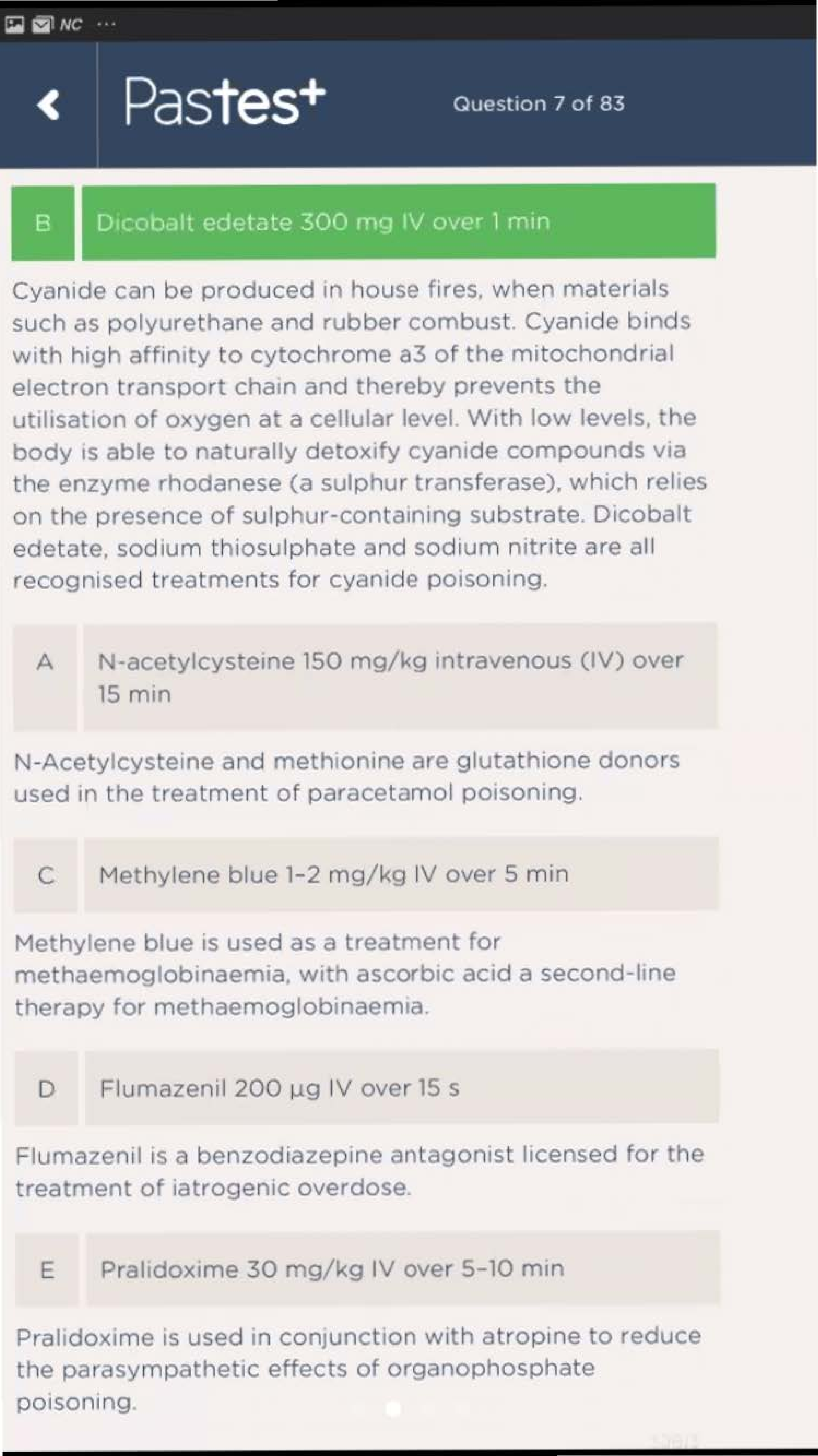
A N-acetylcysteine 150 mg/kg intravenous (IV) over 15 min

B Dicobalt edetate 300 mg IV over 1 min

C Methylene blue 1–2 mg/kg IV over 5 min

D Flumazenil 200 µg IV over 15 s

E Pralidoxime 30 mg/kg IV over 5–10 min



Question 7 of 83

B Dicobalt edetate 300 mg IV over 1 min

Cyanide can be produced in house fires, when materials such as polyurethane and rubber combust. Cyanide binds with high affinity to cytochrome a3 of the mitochondrial electron transport chain and thereby prevents the utilisation of oxygen at a cellular level. With low levels, the body is able to naturally detoxify cyanide compounds via the enzyme rhodanese (a sulphur transferase), which relies on the presence of sulphur-containing substrate. Dicobalt edetate, sodium thiosulphate and sodium nitrite are all recognised treatments for cyanide poisoning.

A N-acetylcysteine 150 mg/kg intravenous (IV) over 15 min

N-Acetylcysteine and methionine are glutathione donors used in the treatment of paracetamol poisoning.

C Methylene blue 1–2 mg/kg IV over 5 min

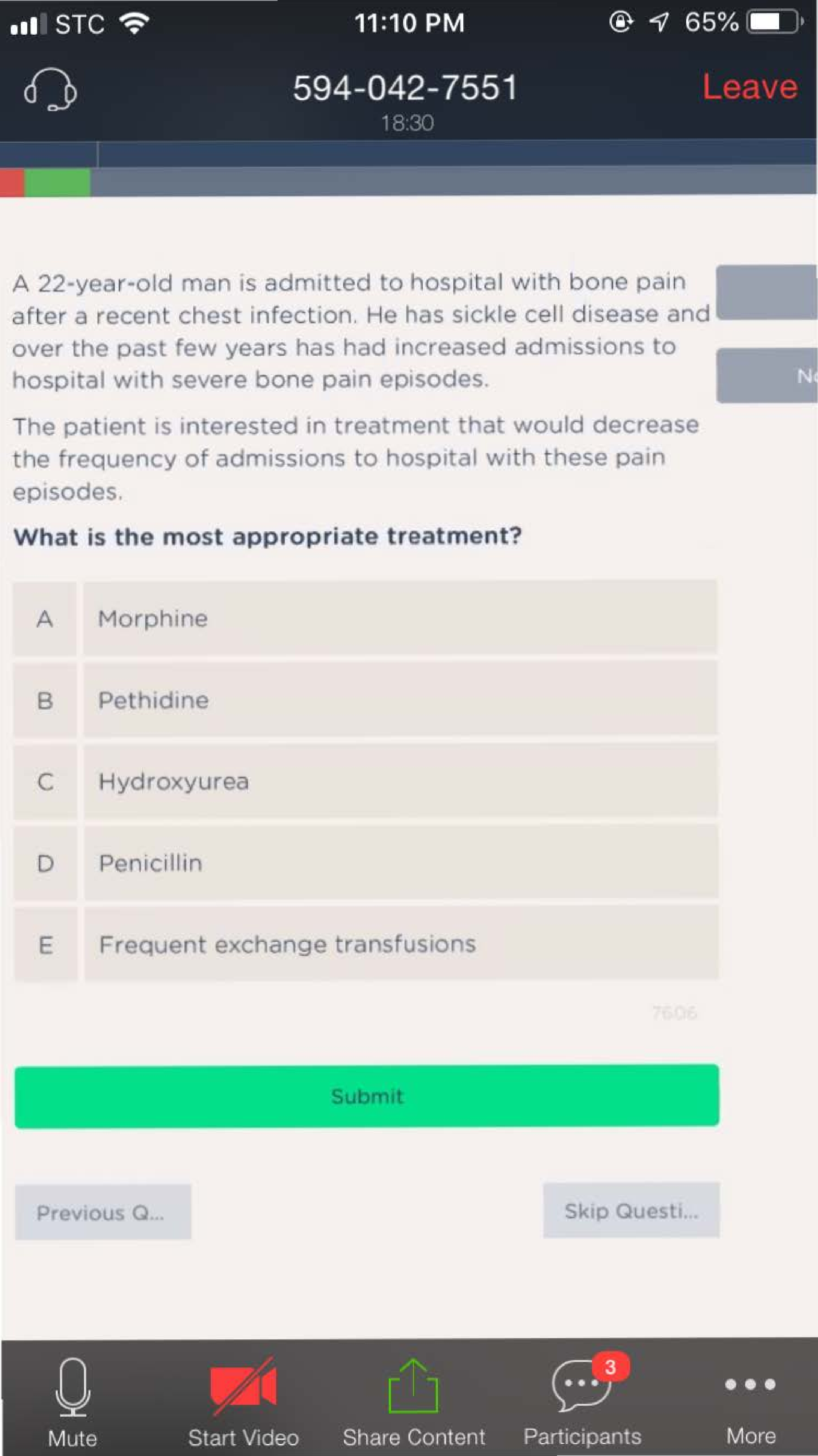
Methylene blue is used as a treatment for methaemoglobinaemia, with ascorbic acid a second-line therapy for methaemoglobinaemia.

D Flumazenil 200 µg IV over 15 s

Flumazenil is a benzodiazepine antagonist licensed for the treatment of iatrogenic overdose.

E Pralidoxime 30 mg/kg IV over 5–10 min

Pralidoxime is used in conjunction with atropine to reduce the parasympathetic effects of organophosphate poisoning.



A 22-year-old man is admitted to hospital with bone pain after a recent chest infection. He has sickle cell disease and over the past few years has had increased admissions to hospital with severe bone pain episodes.

The patient is interested in treatment that would decrease the frequency of admissions to hospital with these pain episodes.

What is the most appropriate treatment?

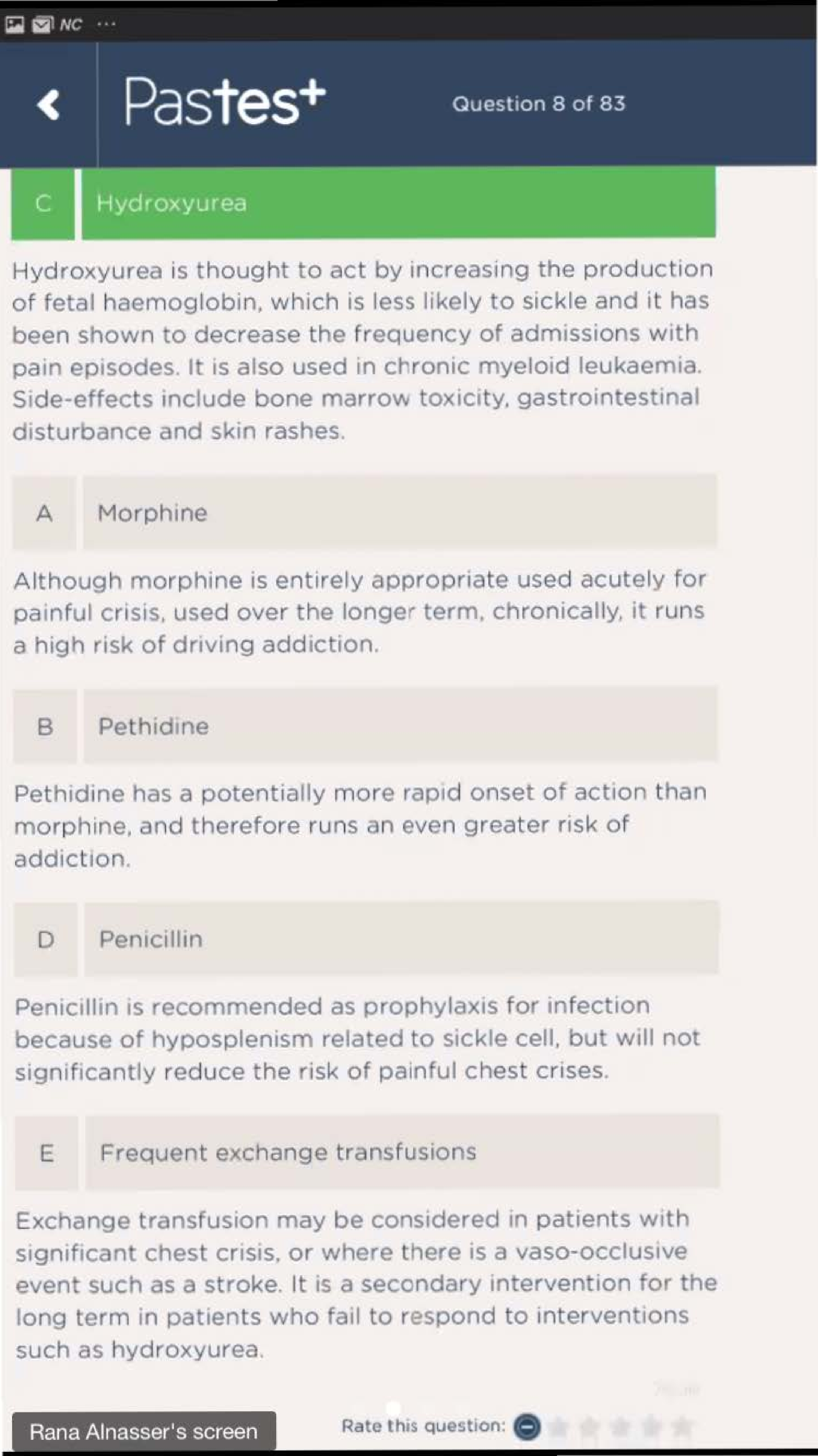
A Morphine

B Pethidine

C Hydroxyurea

D Penicillin

E Frequent exchange transfusions



C Hydroxyurea

Hydroxyurea is thought to act by increasing the production of fetal haemoglobin, which is less likely to sickle and it has been shown to decrease the frequency of admissions with pain episodes. It is also used in chronic myeloid leukaemia. Side-effects include bone marrow toxicity, gastrointestinal disturbance and skin rashes.

A Morphine

Although morphine is entirely appropriate used acutely for painful crisis, used over the longer term, chronically, it runs a high risk of driving addiction.

B Pethidine

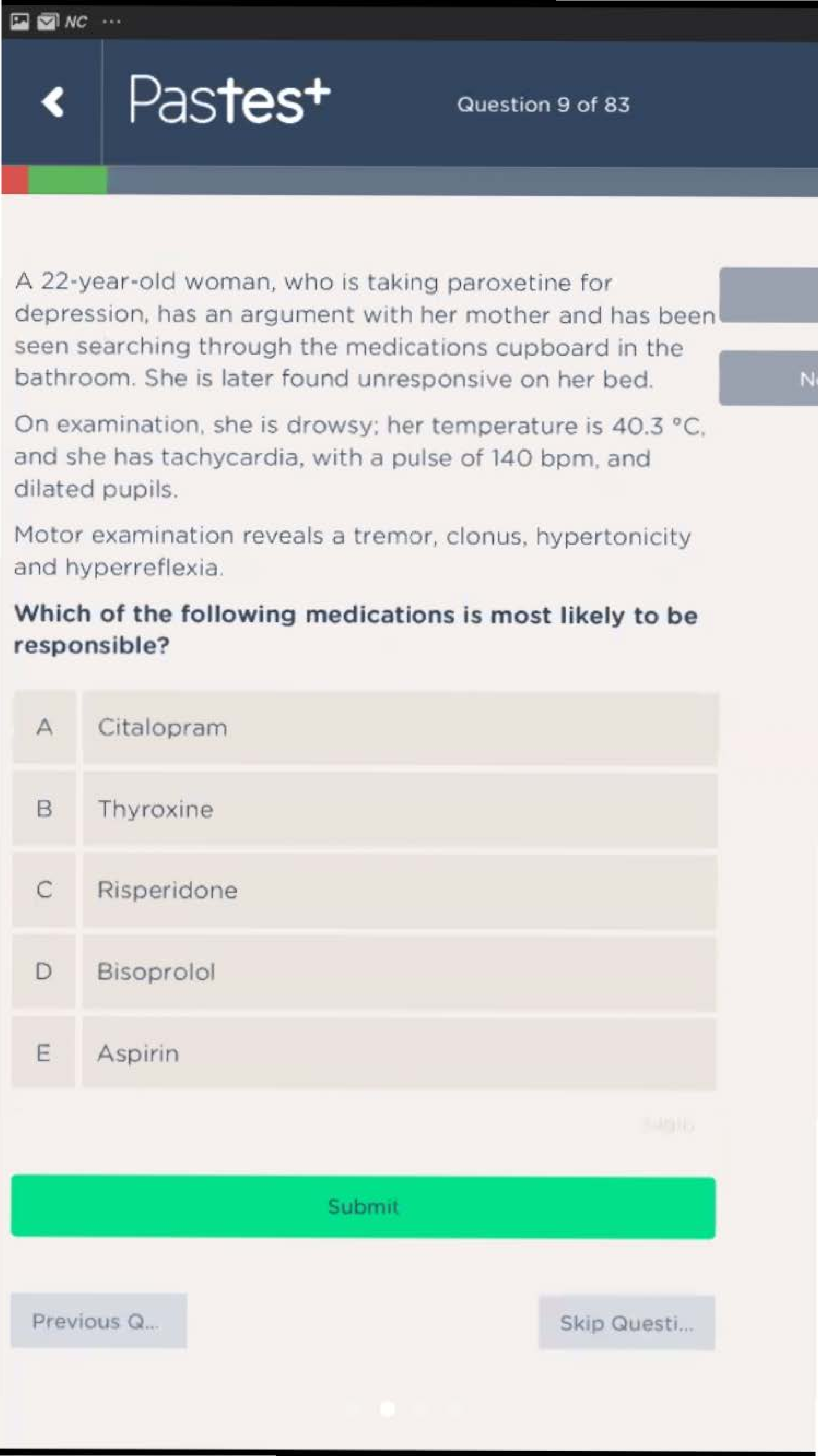
Pethidine has a potentially more rapid onset of action than morphine, and therefore runs an even greater risk of addiction.

D Penicillin

Penicillin is recommended as prophylaxis for infection because of hyposplenism related to sickle cell, but will not significantly reduce the risk of painful chest crises.

E Frequent exchange transfusions

Exchange transfusion may be considered in patients with significant chest crisis, or where there is a vaso-occlusive event such as a stroke. It is a secondary intervention for the long term in patients who fail to respond to interventions such as hydroxyurea.



A 22-year-old woman, who is taking paroxetine for depression, has an argument with her mother and has been seen searching through the medications cupboard in the bathroom. She is later found unresponsive on her bed.

On examination, she is drowsy; her temperature is 40.3 °C, and she has tachycardia, with a pulse of 140 bpm, and dilated pupils.

Motor examination reveals a tremor, clonus, hypertonicity and hyperreflexia.

Which of the following medications is most likely to be responsible?

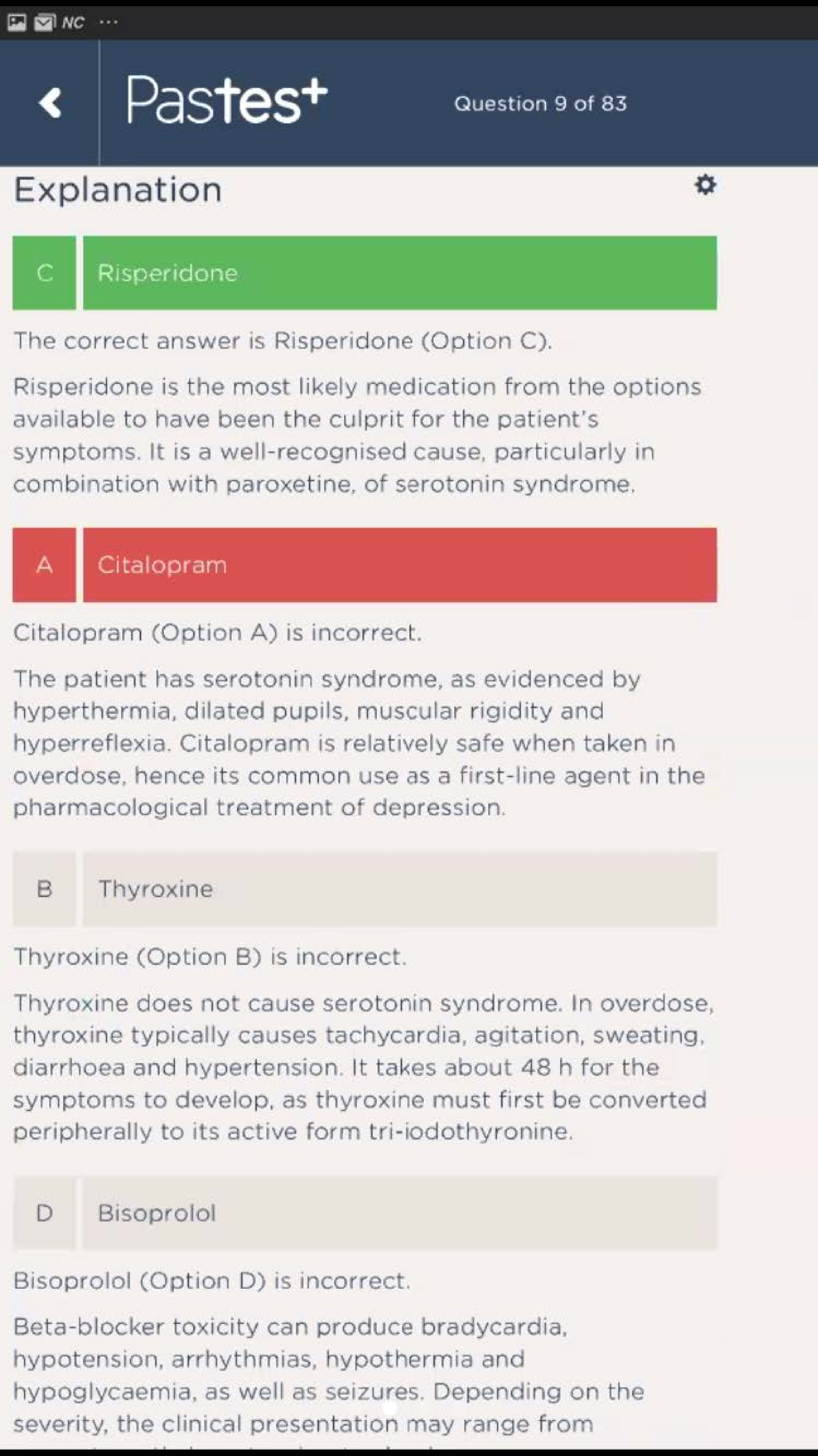
A Citalopram

B Thyroxine

C Risperidone

D Bisoprolol

E Aspirin



Explanation

C **Risperidone**

The correct answer is Risperidone (Option C).

Risperidone is the most likely medication from the options available to have been the culprit for the patient's symptoms. It is a well-recognised cause, particularly in combination with paroxetine, of serotonin syndrome.

A **Citalopram**

Citalopram (Option A) is incorrect.

The patient has serotonin syndrome, as evidenced by hyperthermia, dilated pupils, muscular rigidity and hyperreflexia. Citalopram is relatively safe when taken in overdose, hence its common use as a first-line agent in the pharmacological treatment of depression.

B **Thyroxine**

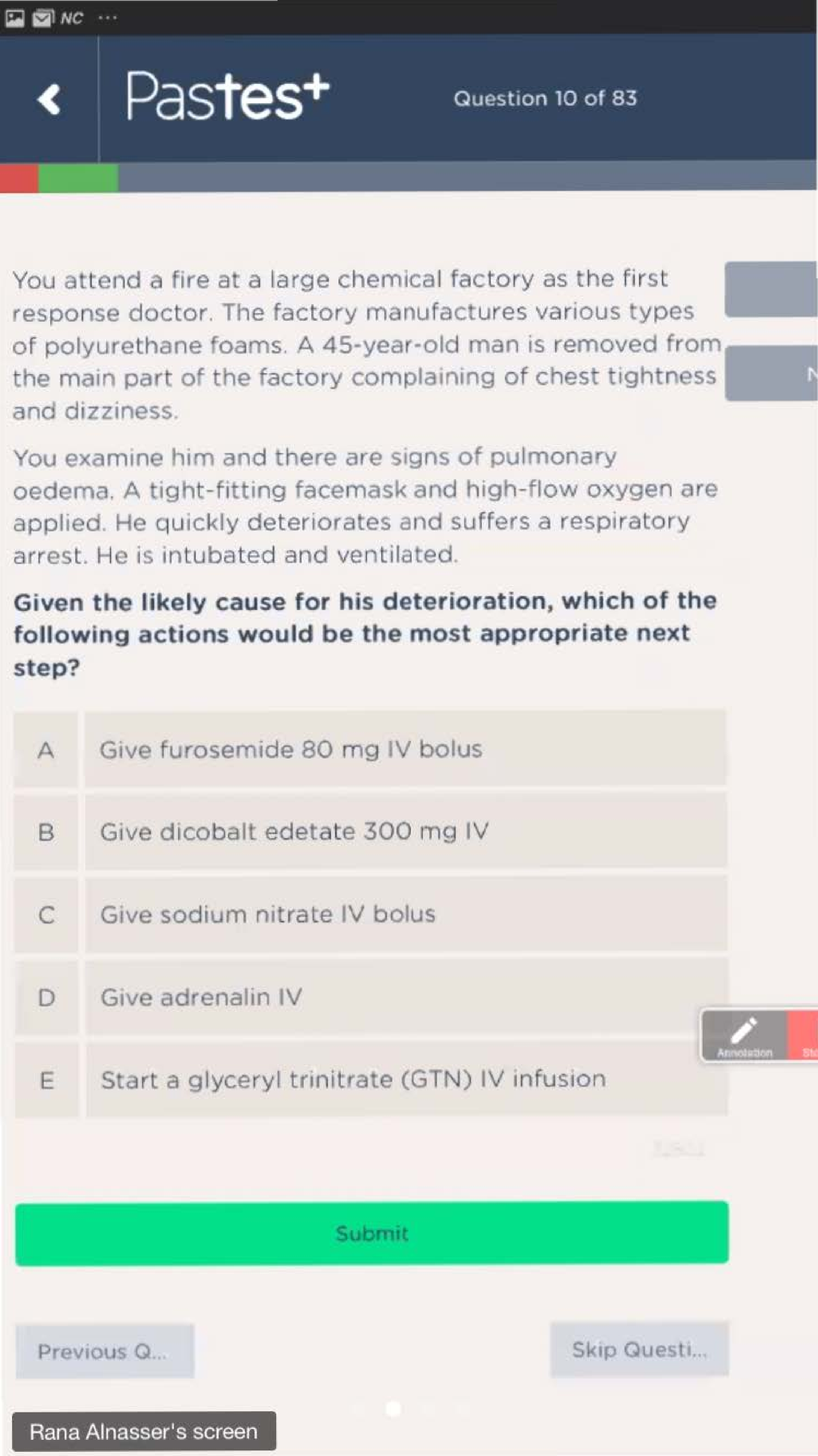
Thyroxine (Option B) is incorrect.

Thyroxine does not cause serotonin syndrome. In overdose, thyroxine typically causes tachycardia, agitation, sweating, diarrhoea and hypertension. It takes about 48 h for the symptoms to develop, as thyroxine must first be converted peripherally to its active form tri-iodothyronine.

D **Bisoprolol**

Bisoprolol (Option D) is incorrect.

Beta-blocker toxicity can produce bradycardia, hypotension, arrhythmias, hypothermia and hypoglycaemia, as well as seizures. Depending on the severity, the clinical presentation may range from

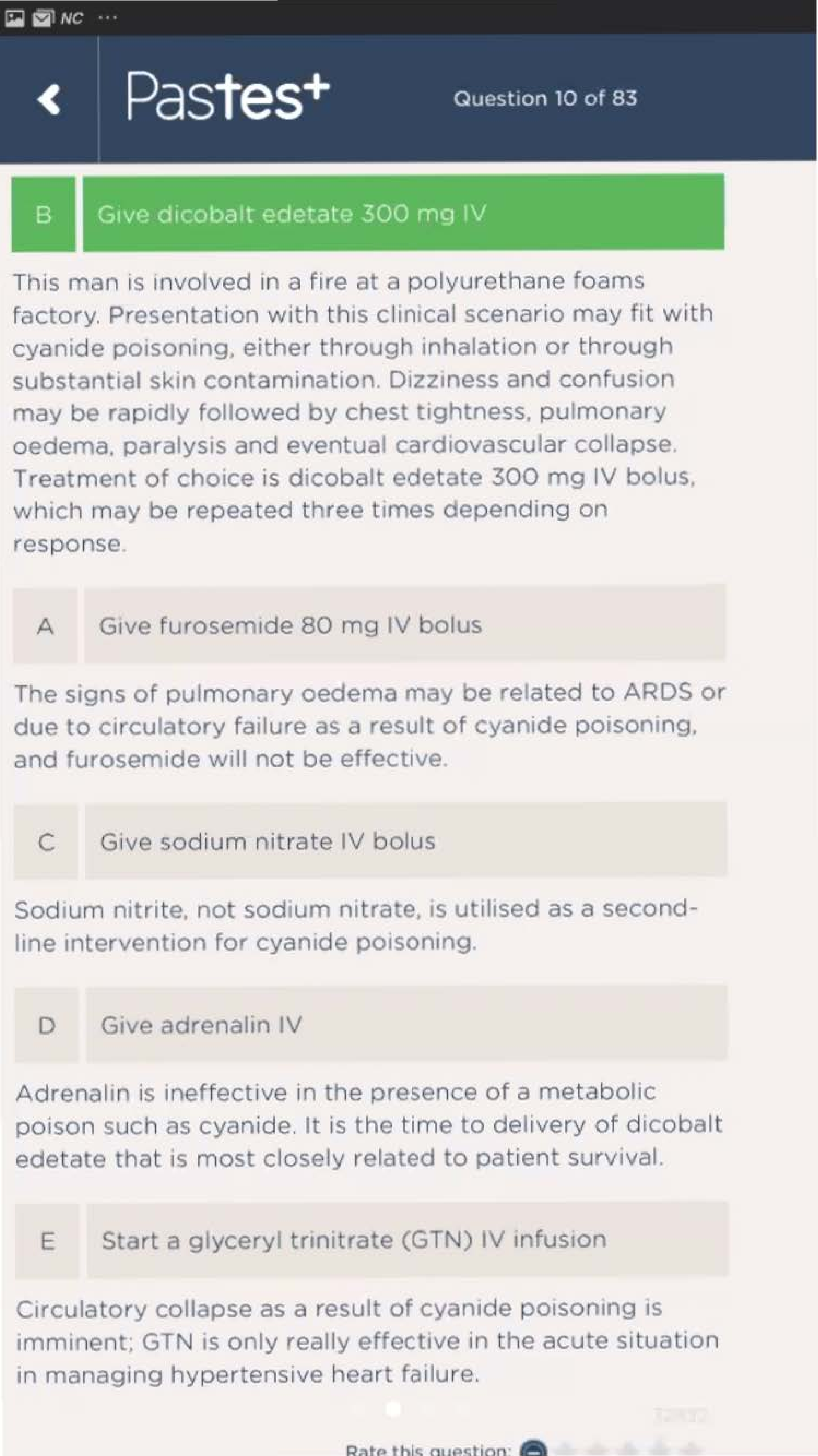


You attend a fire at a large chemical factory as the first response doctor. The factory manufactures various types of polyurethane foams. A 45-year-old man is removed from the main part of the factory complaining of chest tightness and dizziness.

You examine him and there are signs of pulmonary oedema. A tight-fitting facemask and high-flow oxygen are applied. He quickly deteriorates and suffers a respiratory arrest. He is intubated and ventilated.

Given the likely cause for his deterioration, which of the following actions would be the most appropriate next step?

A	Give furosemide 80 mg IV bolus
B	Give dicobalt edetate 300 mg IV
C	Give sodium nitrate IV bolus
D	Give adrenalin IV
E	Start a glyceryl trinitrate (GTN) IV infusion



Question 10 of 83

B Give dicobalt edetate 300 mg IV

This man is involved in a fire at a polyurethane foams factory. Presentation with this clinical scenario may fit with cyanide poisoning, either through inhalation or through substantial skin contamination. Dizziness and confusion may be rapidly followed by chest tightness, pulmonary oedema, paralysis and eventual cardiovascular collapse. Treatment of choice is dicobalt edetate 300 mg IV bolus, which may be repeated three times depending on response.

A Give furosemide 80 mg IV bolus

The signs of pulmonary oedema may be related to ARDS or due to circulatory failure as a result of cyanide poisoning, and furosemide will not be effective.

C Give sodium nitrate IV bolus

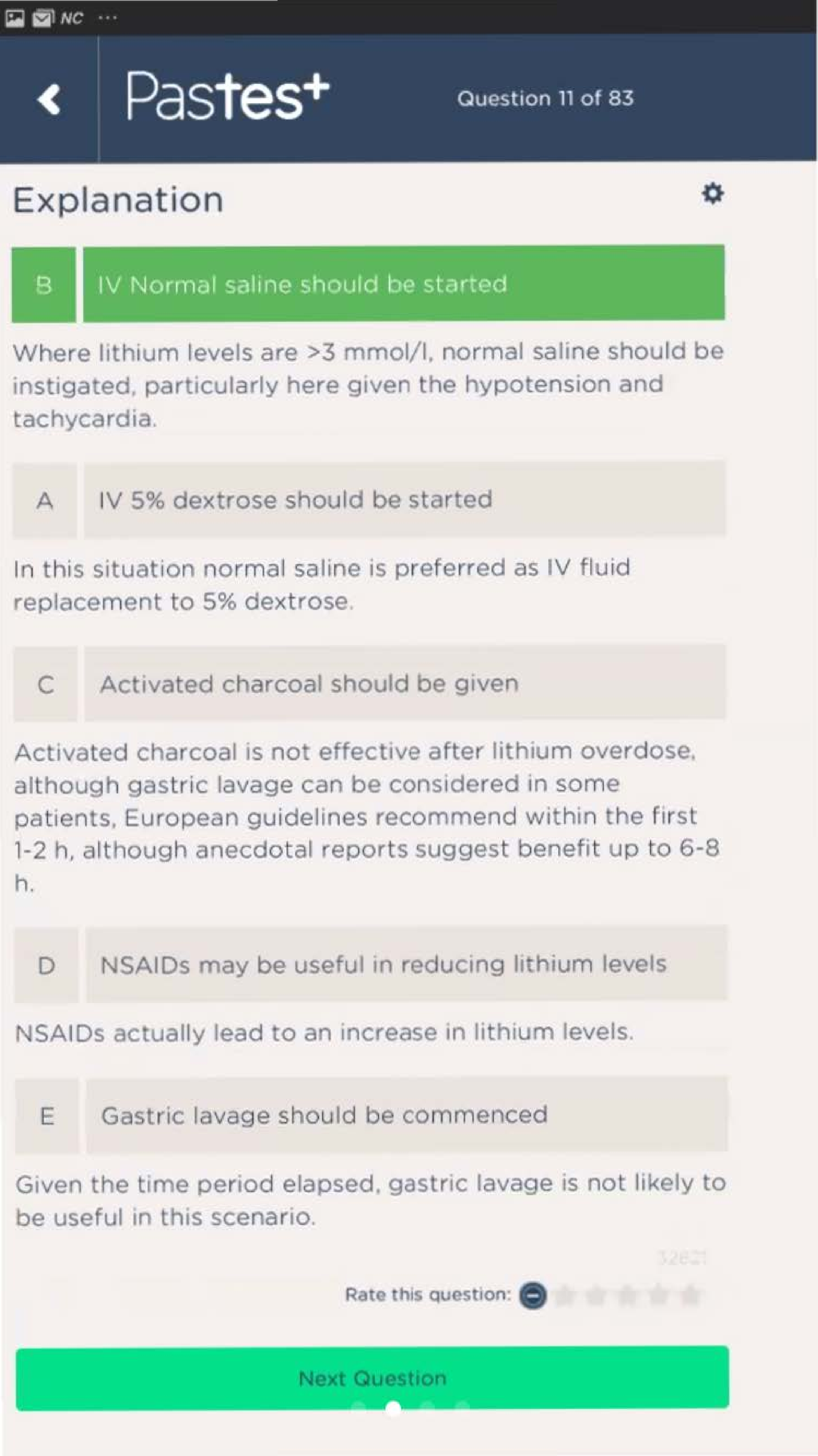
Sodium nitrite, not sodium nitrate, is utilised as a second-line intervention for cyanide poisoning.

D Give adrenalin IV

Adrenalin is ineffective in the presence of a metabolic poison such as cyanide. It is the time to delivery of dicobalt edetate that is most closely related to patient survival.

E Start a glyceryl trinitrate (GTN) IV infusion

Circulatory collapse as a result of cyanide poisoning is imminent; GTN is only really effective in the acute situation in managing hypertensive heart failure.



Explanation

B IV Normal saline should be started

Where lithium levels are >3 mmol/l, normal saline should be instigated, particularly here given the hypotension and tachycardia.

A IV 5% dextrose should be started

In this situation normal saline is preferred as IV fluid replacement to 5% dextrose.

C Activated charcoal should be given

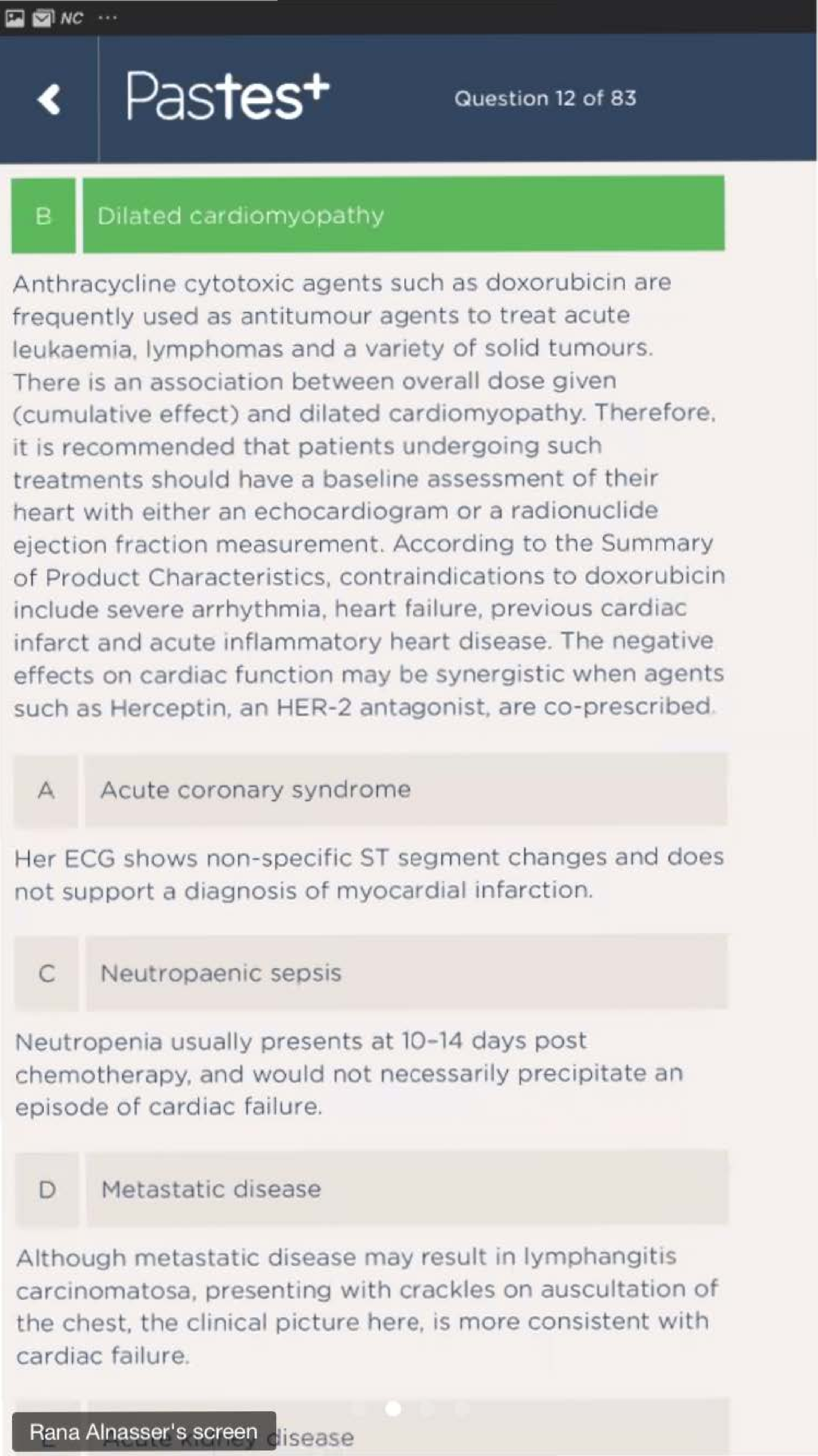
Activated charcoal is not effective after lithium overdose, although gastric lavage can be considered in some patients, European guidelines recommend within the first 1-2 h, although anecdotal reports suggest benefit up to 6-8 h.

D NSAIDs may be useful in reducing lithium levels

NSAIDs actually lead to an increase in lithium levels.

E Gastric lavage should be commenced

Given the time period elapsed, gastric lavage is not likely to be useful in this scenario.



B Dilated cardiomyopathy

Anthracycline cytotoxic agents such as doxorubicin are frequently used as antitumour agents to treat acute leukaemia, lymphomas and a variety of solid tumours. There is an association between overall dose given (cumulative effect) and dilated cardiomyopathy. Therefore, it is recommended that patients undergoing such treatments should have a baseline assessment of their heart with either an echocardiogram or a radionuclide ejection fraction measurement. According to the Summary of Product Characteristics, contraindications to doxorubicin include severe arrhythmia, heart failure, previous cardiac infarct and acute inflammatory heart disease. The negative effects on cardiac function may be synergistic when agents such as Herceptin, an HER-2 antagonist, are co-prescribed.

A Acute coronary syndrome

Her ECG shows non-specific ST segment changes and does not support a diagnosis of myocardial infarction.

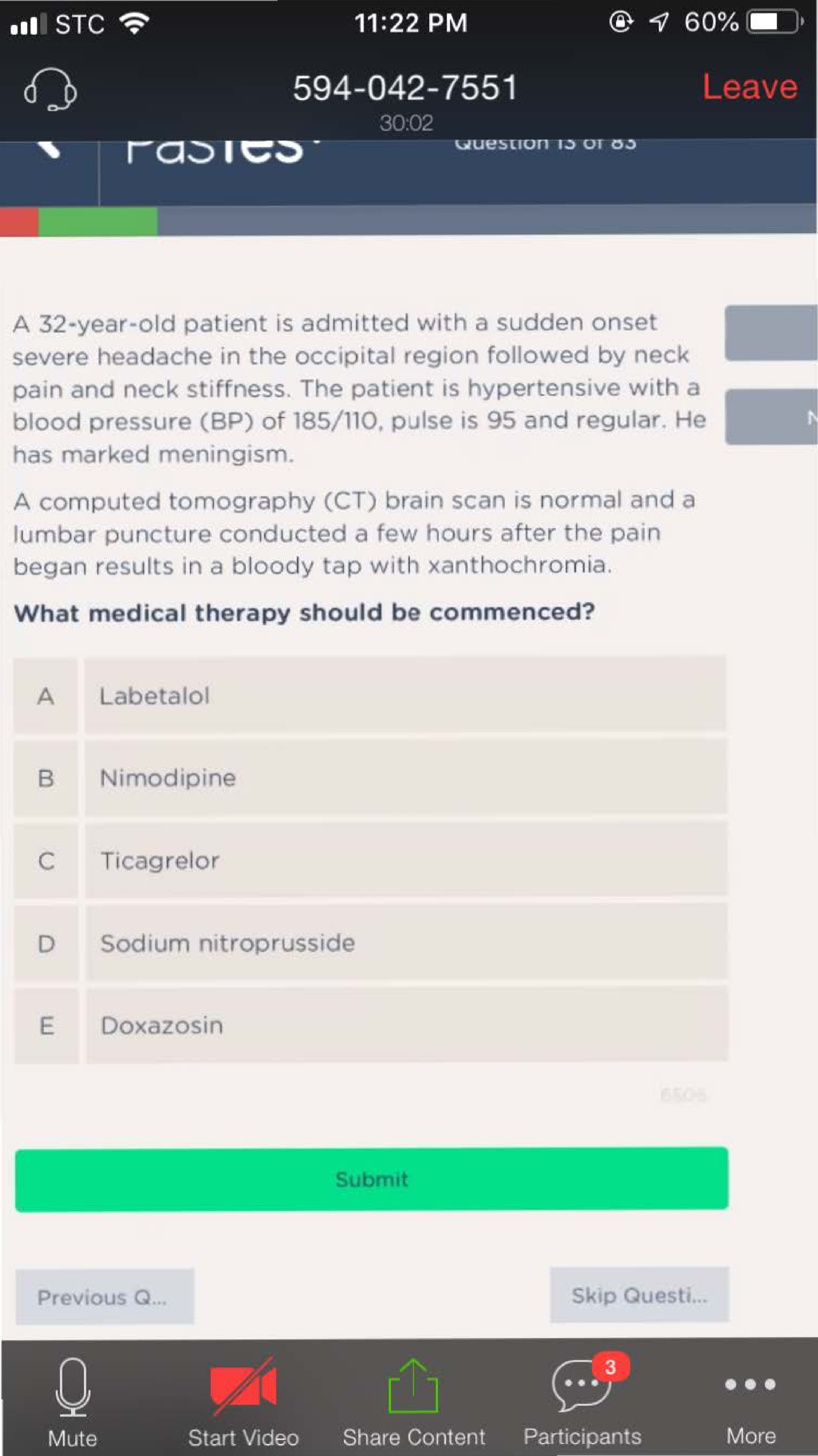
C Neutropaenic sepsis

Neutropenia usually presents at 10–14 days post chemotherapy, and would not necessarily precipitate an episode of cardiac failure.

D Metastatic disease

Although metastatic disease may result in lymphangitis carcinomatosa, presenting with crackles on auscultation of the chest, the clinical picture here, is more consistent with cardiac failure.

E Acute kidney disease

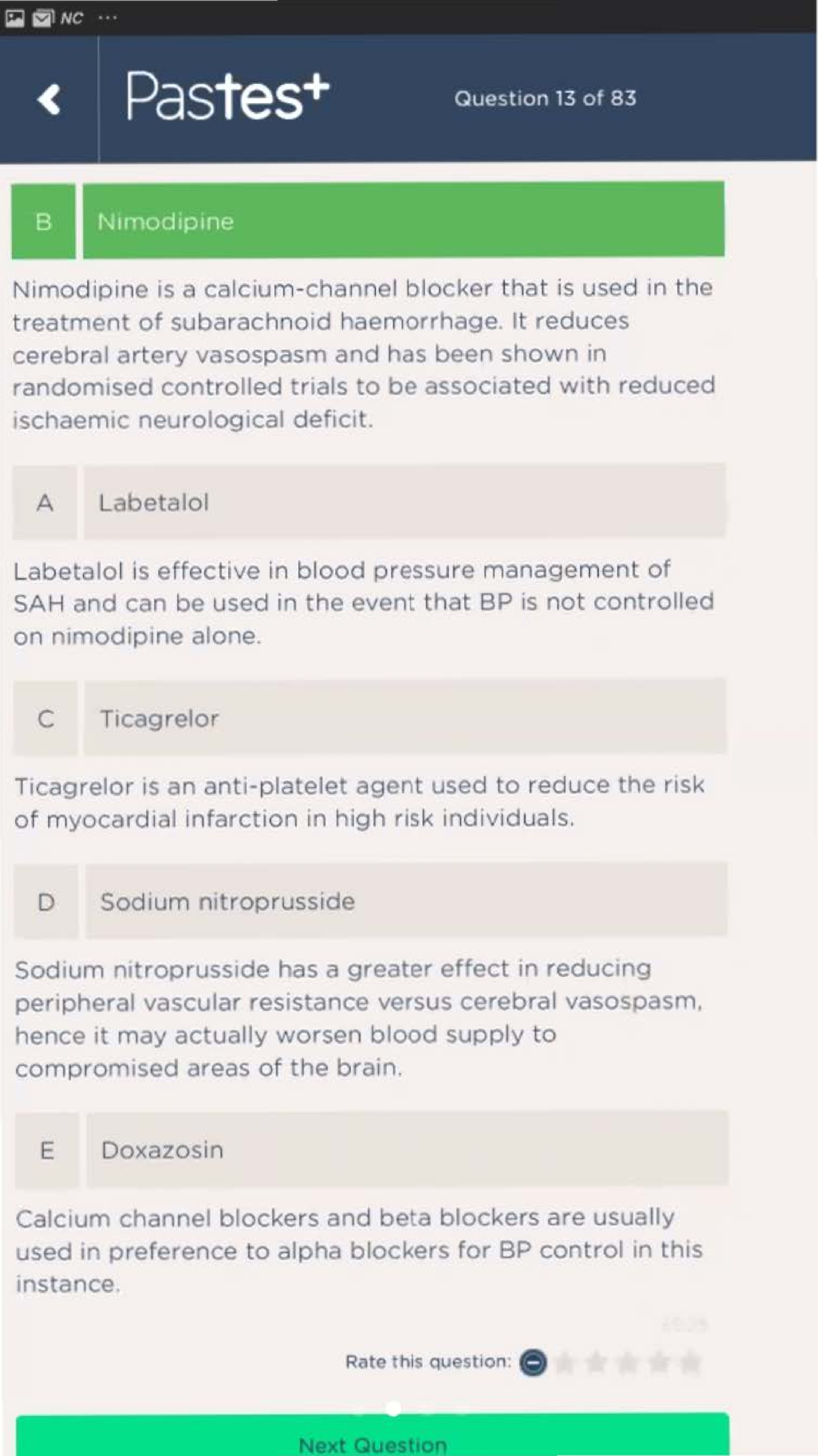


A 32-year-old patient is admitted with a sudden onset severe headache in the occipital region followed by neck pain and neck stiffness. The patient is hypertensive with a blood pressure (BP) of 185/110, pulse is 95 and regular. He has marked meningism.

A computed tomography (CT) brain scan is normal and a lumbar puncture conducted a few hours after the pain began results in a bloody tap with xanthochromia.

What medical therapy should be commenced?

A Labetalol
B Nimodipine
C Ticagrelor
D Sodium nitroprusside
E Doxazosin



Question 13 of 83

B Nimodipine

Nimodipine is a calcium-channel blocker that is used in the treatment of subarachnoid haemorrhage. It reduces cerebral artery vasospasm and has been shown in randomised controlled trials to be associated with reduced ischaemic neurological deficit.

A Labetalol

Labetalol is effective in blood pressure management of SAH and can be used in the event that BP is not controlled on nimodipine alone.

C Ticagrelor

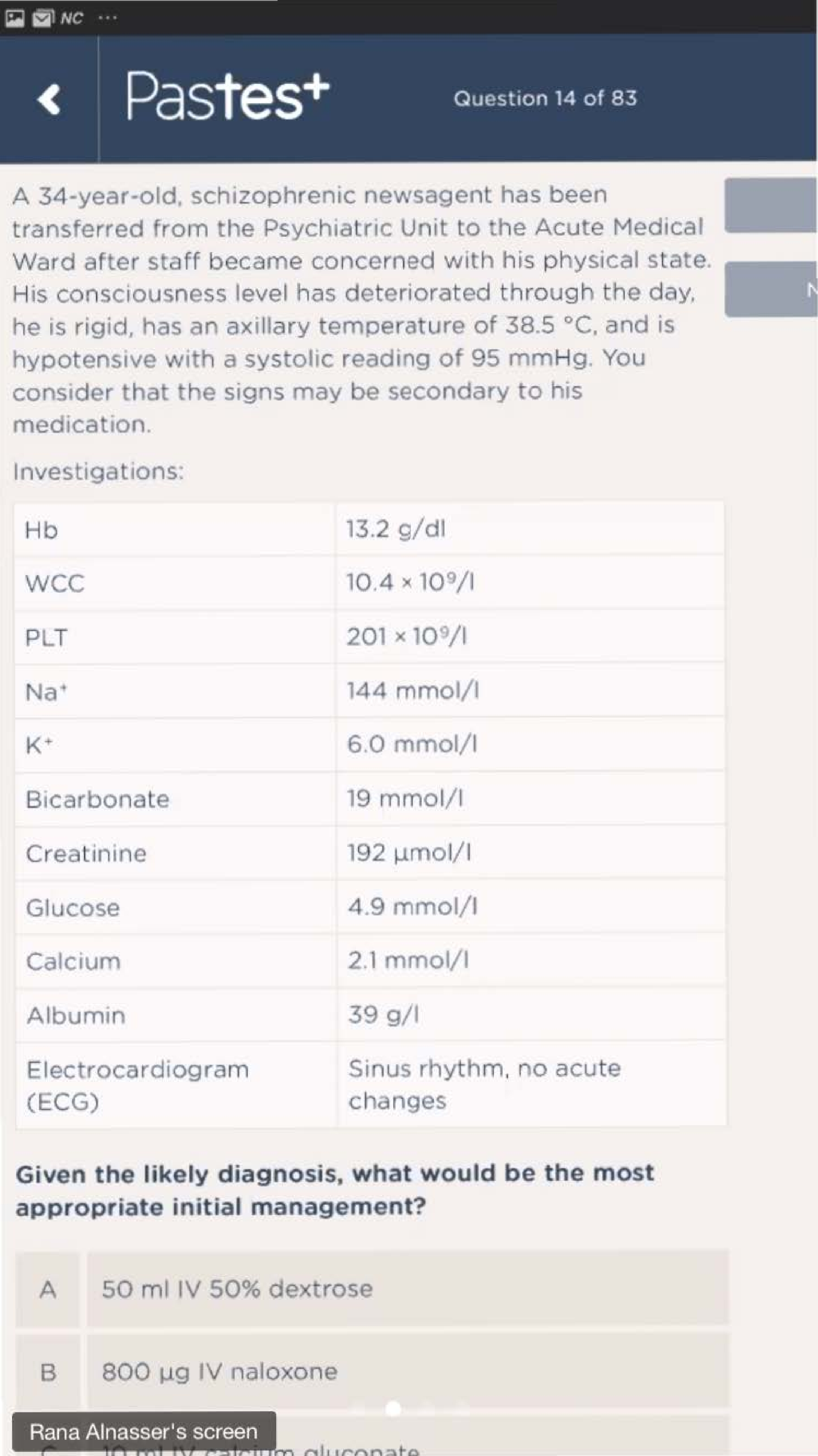
Ticagrelor is an anti-platelet agent used to reduce the risk of myocardial infarction in high risk individuals.

D Sodium nitroprusside

Sodium nitroprusside has a greater effect in reducing peripheral vascular resistance versus cerebral vasospasm, hence it may actually worsen blood supply to compromised areas of the brain.

E Doxazosin

Calcium channel blockers and beta blockers are usually used in preference to alpha blockers for BP control in this instance.



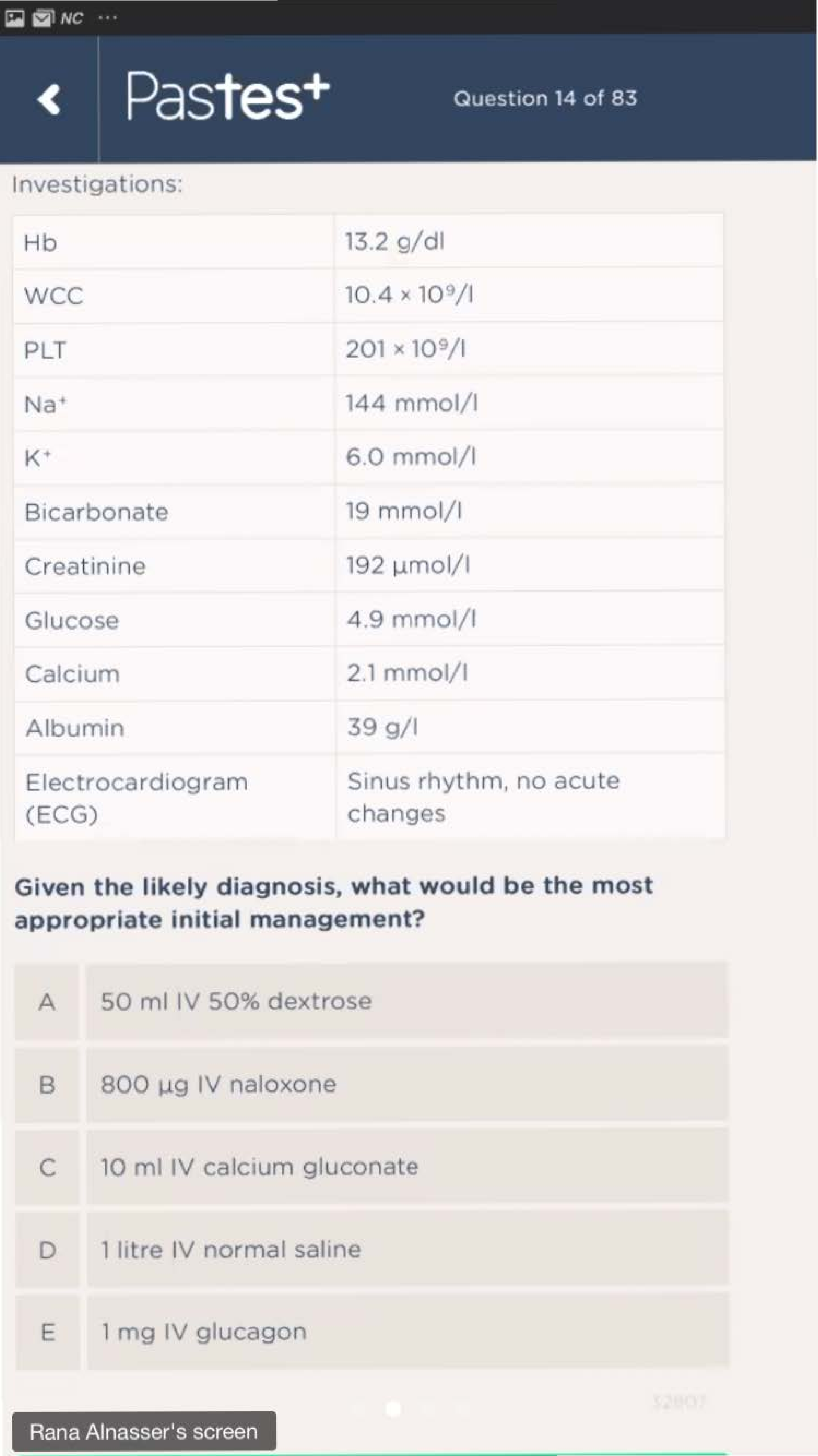
A 34-year-old, schizophrenic newsagent has been transferred from the Psychiatric Unit to the Acute Medical Ward after staff became concerned with his physical state. His consciousness level has deteriorated through the day, he is rigid, has an axillary temperature of 38.5 °C, and is hypotensive with a systolic reading of 95 mmHg. You consider that the signs may be secondary to his medication.

Investigations:

Hb	13.2 g/dl
WCC	10.4 × 10^9/l
PLT	201 × 10^9/l
Na^+	144 mmol/l
K^+	6.0 mmol/l
Bicarbonate	19 mmol/l
Creatinine	192 µmol/l
Glucose	4.9 mmol/l
Calcium	2.1 mmol/l
Albumin	39 g/l
Electrocardiogram (ECG)	Sinus rhythm, no acute changes

Given the likely diagnosis, what would be the most appropriate initial management?

A	50 ml IV 50% dextrose
B	800 µg IV naloxone
C	10 ml IV calcium gluconate



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Electrocardiogram (ECG)	Sinus rhythm, no acute changes

Given the likely diagnosis, what would be the most appropriate initial management?

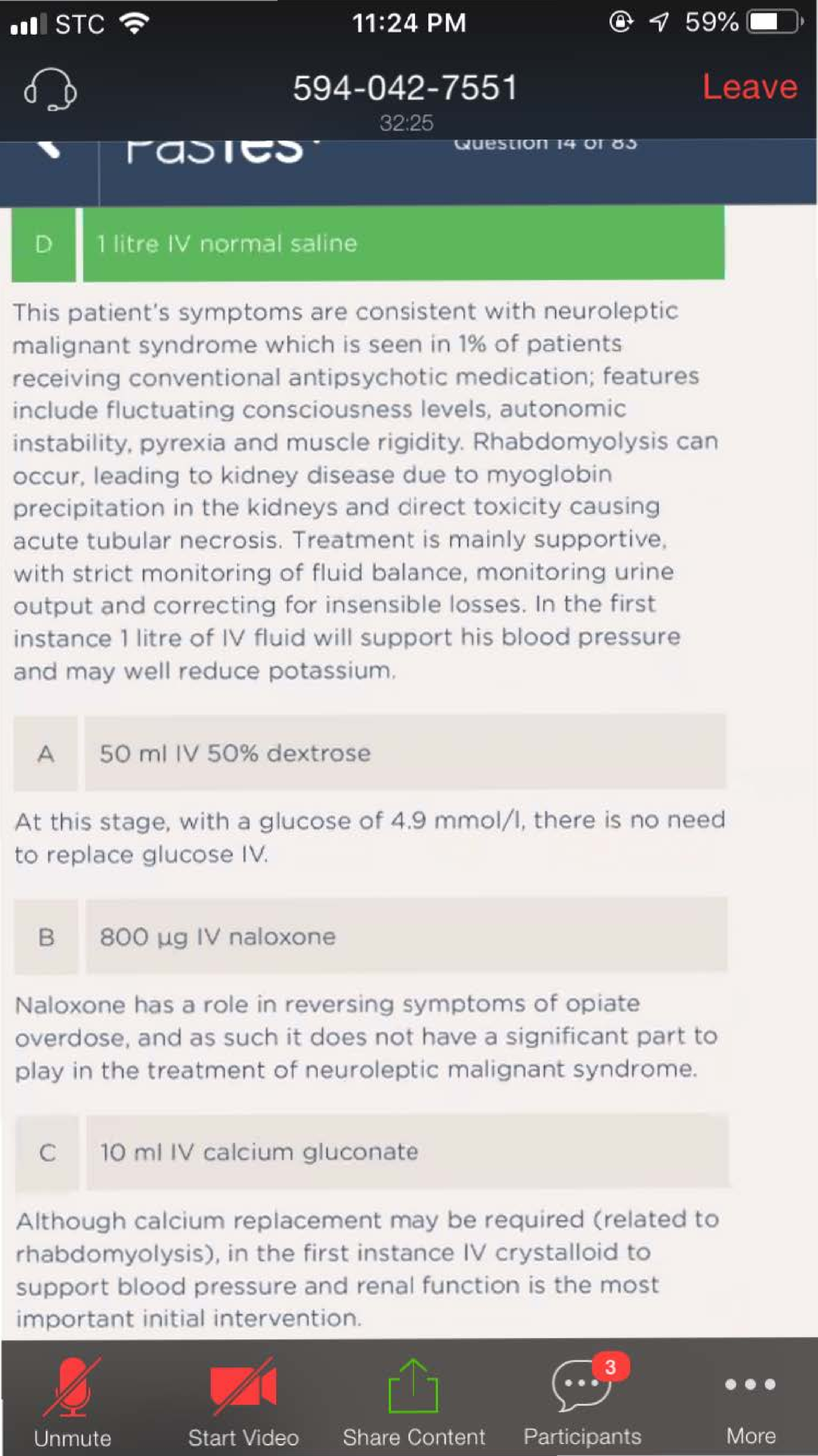
A 50 ml IV 50% dextrose

B 800 µg IV naloxone

C 10 ml IV calcium gluconate

D 1 litre IV normal saline

E 1 mg IV glucagon



D 1 litre IV normal saline

This patient's symptoms are consistent with neuroleptic malignant syndrome which is seen in 1% of patients receiving conventional antipsychotic medication; features include fluctuating consciousness levels, autonomic instability, pyrexia and muscle rigidity. Rhabdomyolysis can occur, leading to kidney disease due to myoglobin precipitation in the kidneys and direct toxicity causing acute tubular necrosis. Treatment is mainly supportive, with strict monitoring of fluid balance, monitoring urine output and correcting for insensible losses. In the first instance 1 litre of IV fluid will support his blood pressure and may well reduce potassium.

A 50 ml IV 50% dextrose

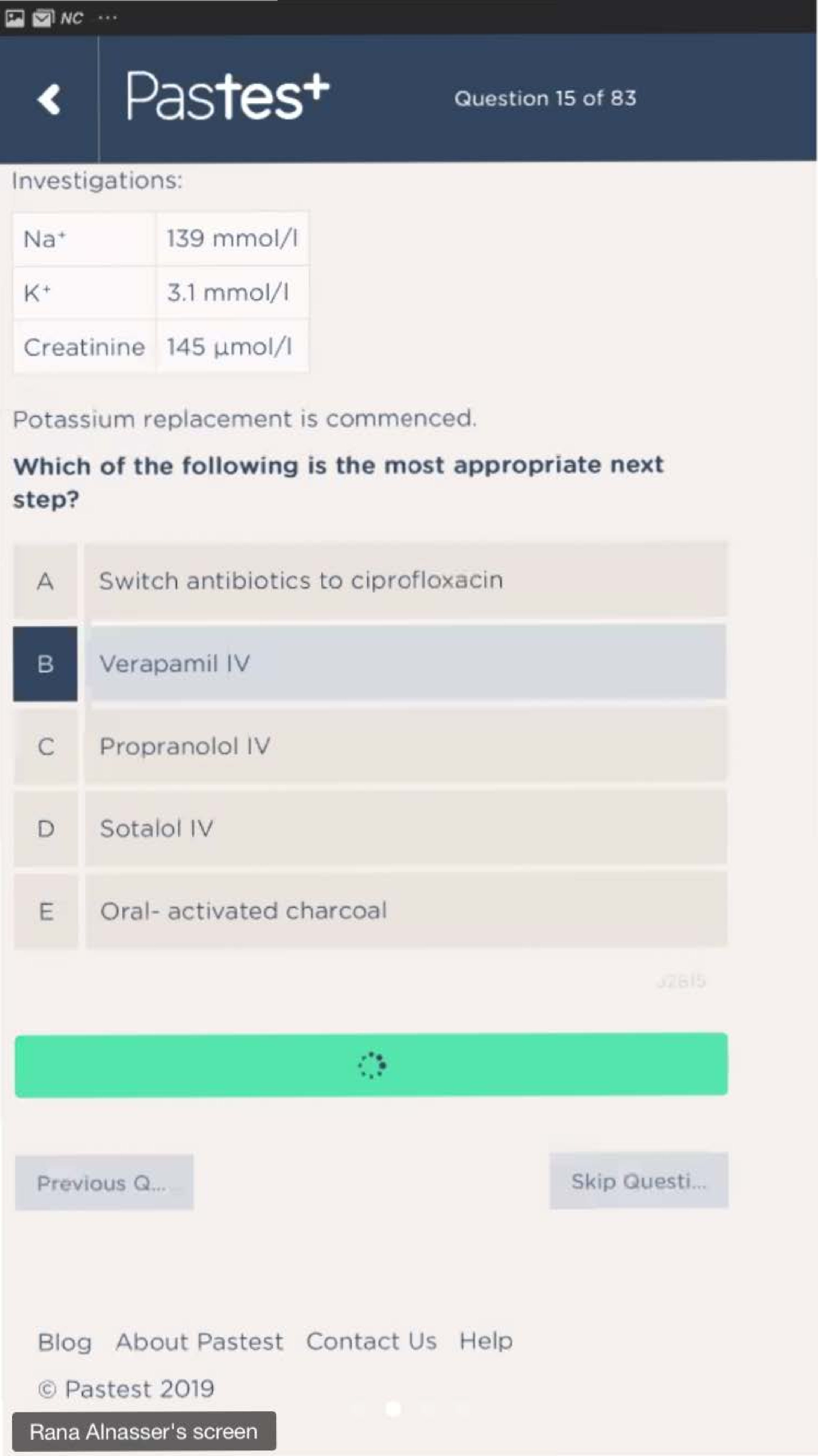
At this stage, with a glucose of 4.9 mmol/l, there is no need to replace glucose IV.

B 800 µg IV naloxone

Naloxone has a role in reversing symptoms of opiate overdose, and as such it does not have a significant part to play in the treatment of neuroleptic malignant syndrome.

C 10 ml IV calcium gluconate

Although calcium replacement may be required (related to rhabdomyolysis), in the first instance IV crystalloid to support blood pressure and renal function is the most important initial intervention.



Investigations:

Na^+	139 mmol/l
K^+	3.1 mmol/l
Creatinine	145 µmol/l

Potassium replacement is commenced.

Which of the following is the most appropriate next step?

- A Switch antibiotics to ciprofloxacin
- B Verapamil IV
- C Propranolol IV
- D Sotalol IV
- E Oral- activated charcoal

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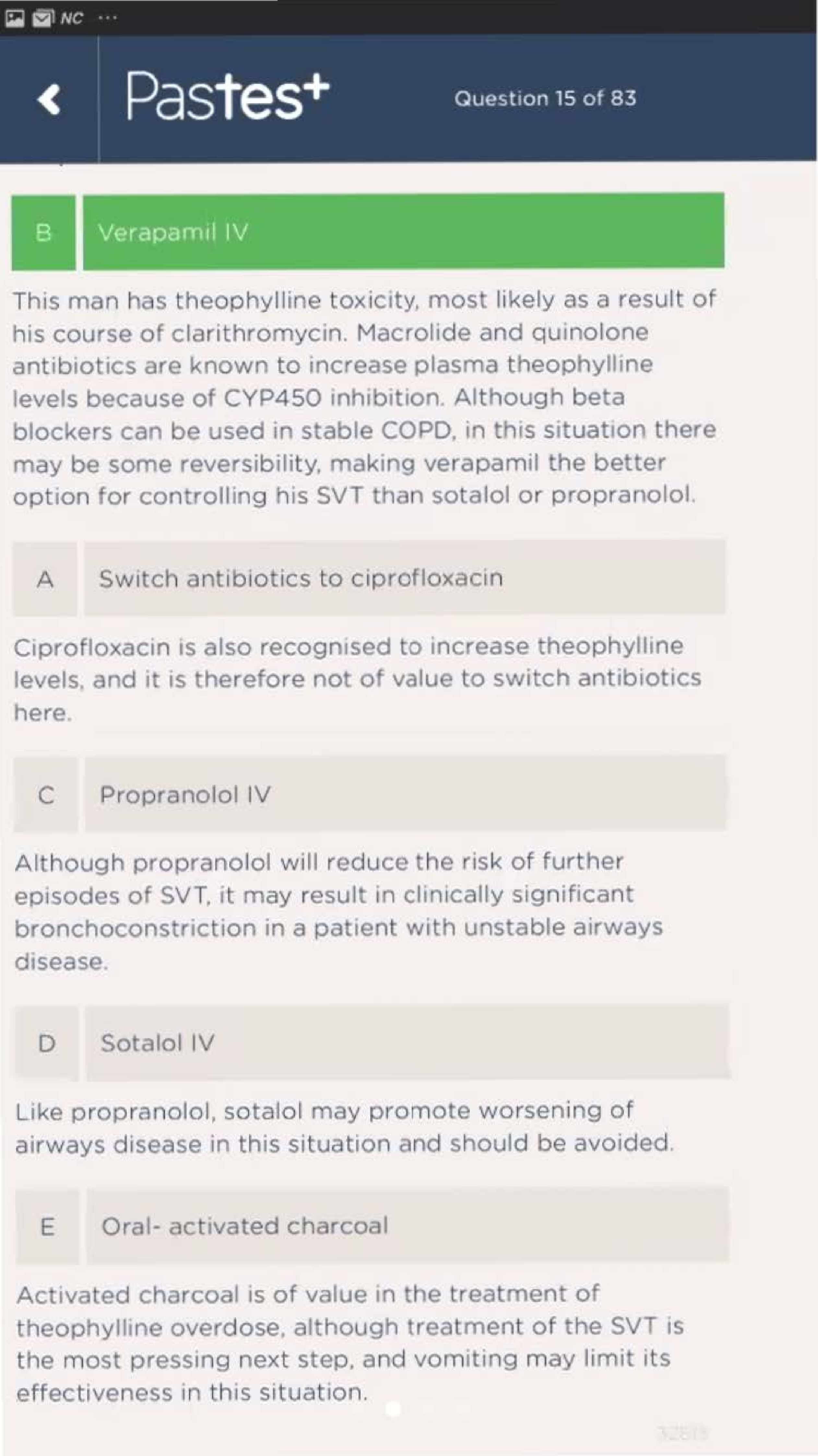


B Verapamil IV

This man has theophylline toxicity, most likely as a result of his course of clarithromycin. Macrolide and quinolone antibiotics are known to increase plasma theophylline levels because of CYP450 inhibition. Although beta blockers can be used in stable COPD, in this situation there may be some reversibility, making verapamil the better option for controlling his SVT than sotalol or propranolol.

A Switch antibiotics to ciprofloxacin

Ciprofloxacin is also recognised to increase theophylline levels, and it is therefore not of value to switch antibiotics here.

C Propranolol IV

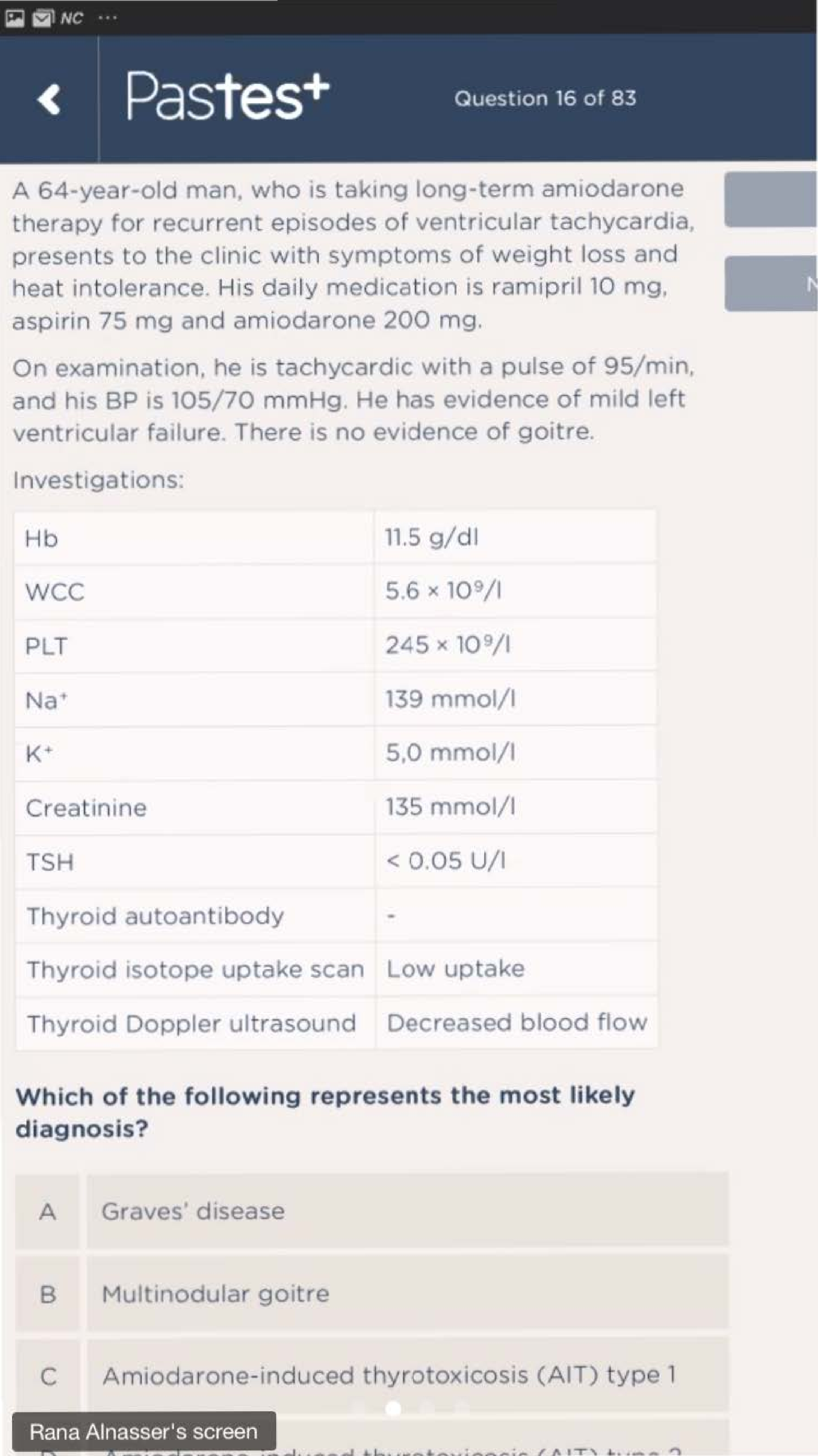
Although propranolol will reduce the risk of further episodes of SVT, it may result in clinically significant bronchoconstriction in a patient with unstable airways disease.

D Sotalol IV

Like propranolol, sotalol may promote worsening of airways disease in this situation and should be avoided.

E Oral- activated charcoal

Activated charcoal is of value in the treatment of theophylline overdose, although treatment of the SVT is the most pressing next step, and vomiting may limit its effectiveness in this situation.



A 64-year-old man, who is taking long-term amiodarone therapy for recurrent episodes of ventricular tachycardia, presents to the clinic with symptoms of weight loss and heat intolerance. His daily medication is ramipril 10 mg, aspirin 75 mg and amiodarone 200 mg.

On examination, he is tachycardic with a pulse of 95/min, and his BP is 105/70 mmHg. He has evidence of mild left ventricular failure. There is no evidence of goitre.

Investigations:

Hb	11.5 g/dl
WCC	5.6 × 10^9/l
PLT	245 × 10^9/l
Na^+	139 mmol/l
K^+	5,0 mmol/l
Creatinine	135 mmol/l
TSH	< 0.05 U/l
Thyroid autoantibody	-
Thyroid isotope uptake scan	Low uptake
Thyroid Doppler ultrasound	Decreased blood flow

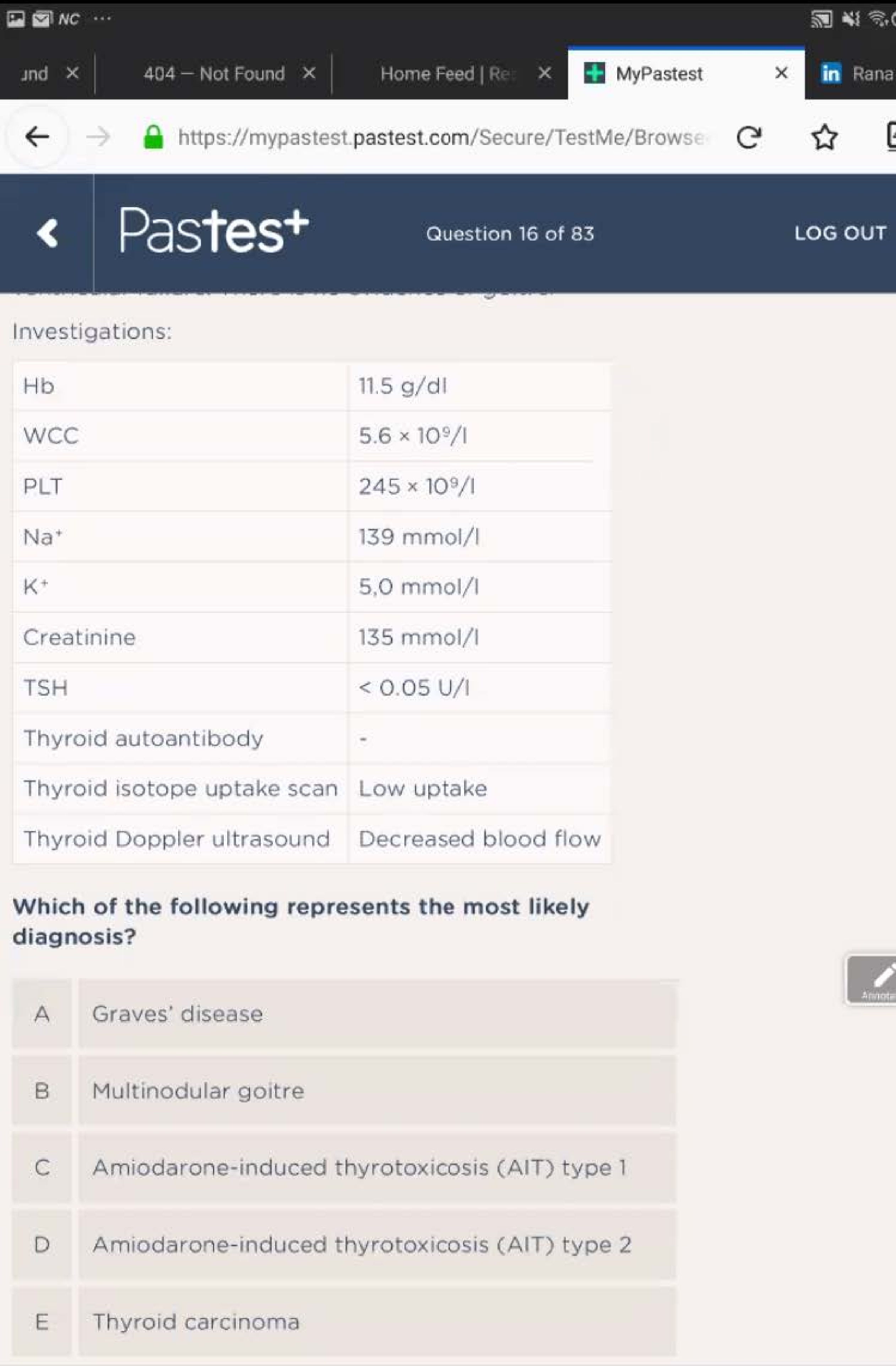
Which of the following represents the most likely diagnosis?

A Graves' disease

B Multinodular goitre

C Amiodarone-induced thyrotoxicosis (AIT) type 1

D Amiodarone-induced thyrotoxicosis (AIT) type 2



Investigations:

Hb	11.5 g/dl
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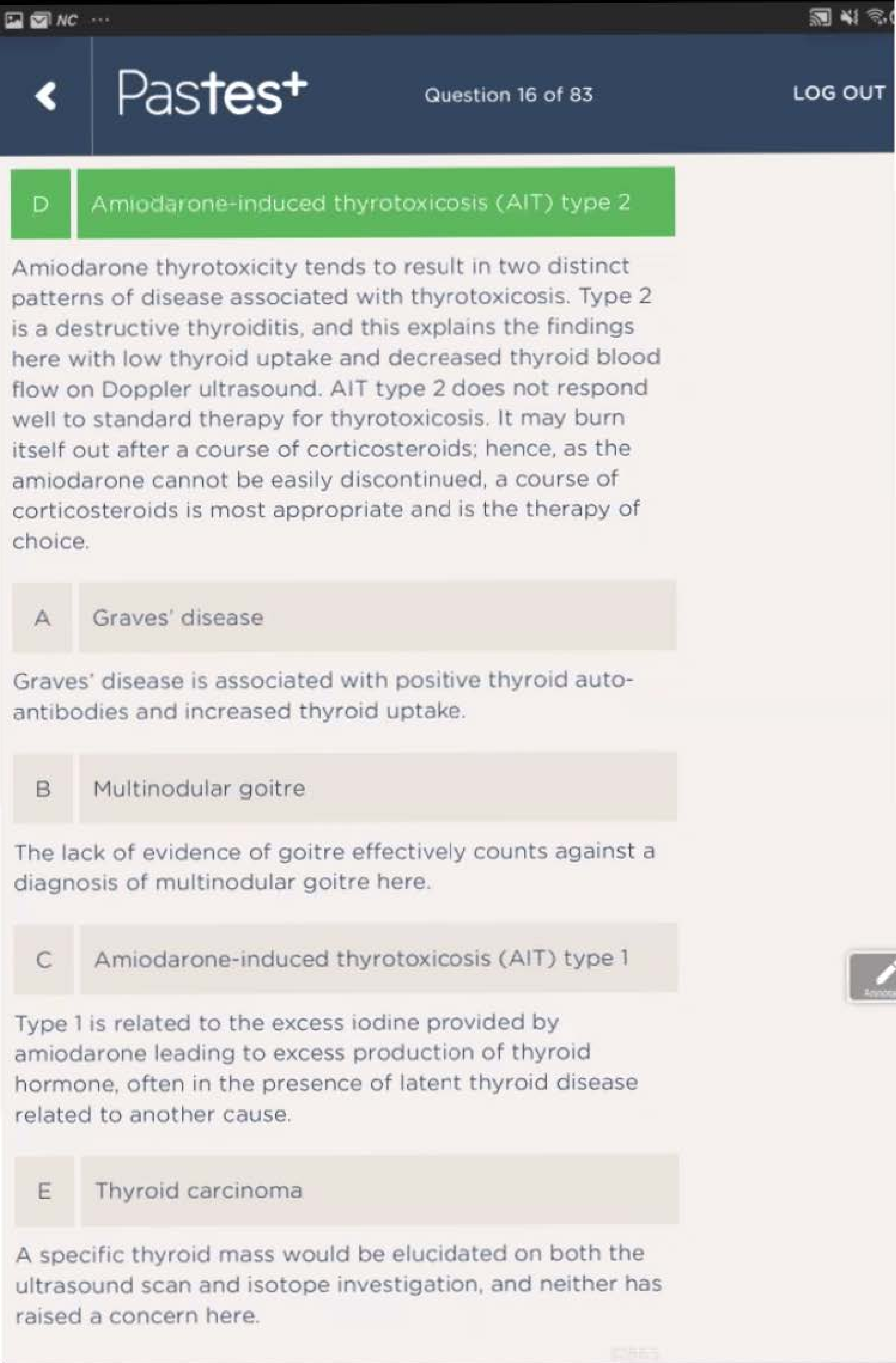
Thyroid autoantibody	-
Thyroid isotope uptake scan	Low uptake
Thyroid Doppler ultrasound	Decreased blood flow

Which of the following represents the most likely diagnosis?

A	Graves' disease
B	Multinodular goitre
C	Amiodarone-induced thyrotoxicosis (AIT) type 1
D	Amiodarone-induced thyrotoxicosis (AIT) type 2
E	Thyroid carcinoma



D Amiodarone-induced thyrotoxicosis (AIT) type 2

Amiodarone thyrotoxicity tends to result in two distinct patterns of disease associated with thyrotoxicosis. Type 2 is a destructive thyroiditis, and this explains the findings here with low thyroid uptake and decreased thyroid blood flow on Doppler ultrasound. AIT type 2 does not respond well to standard therapy for thyrotoxicosis. It may burn itself out after a course of corticosteroids; hence, as the amiodarone cannot be easily discontinued, a course of corticosteroids is most appropriate and is the therapy of choice.

A Graves' disease

Graves' disease is associated with positive thyroid auto-antibodies and increased thyroid uptake.

B Multinodular goitre

The lack of evidence of goitre effectively counts against a diagnosis of multinodular goitre here.

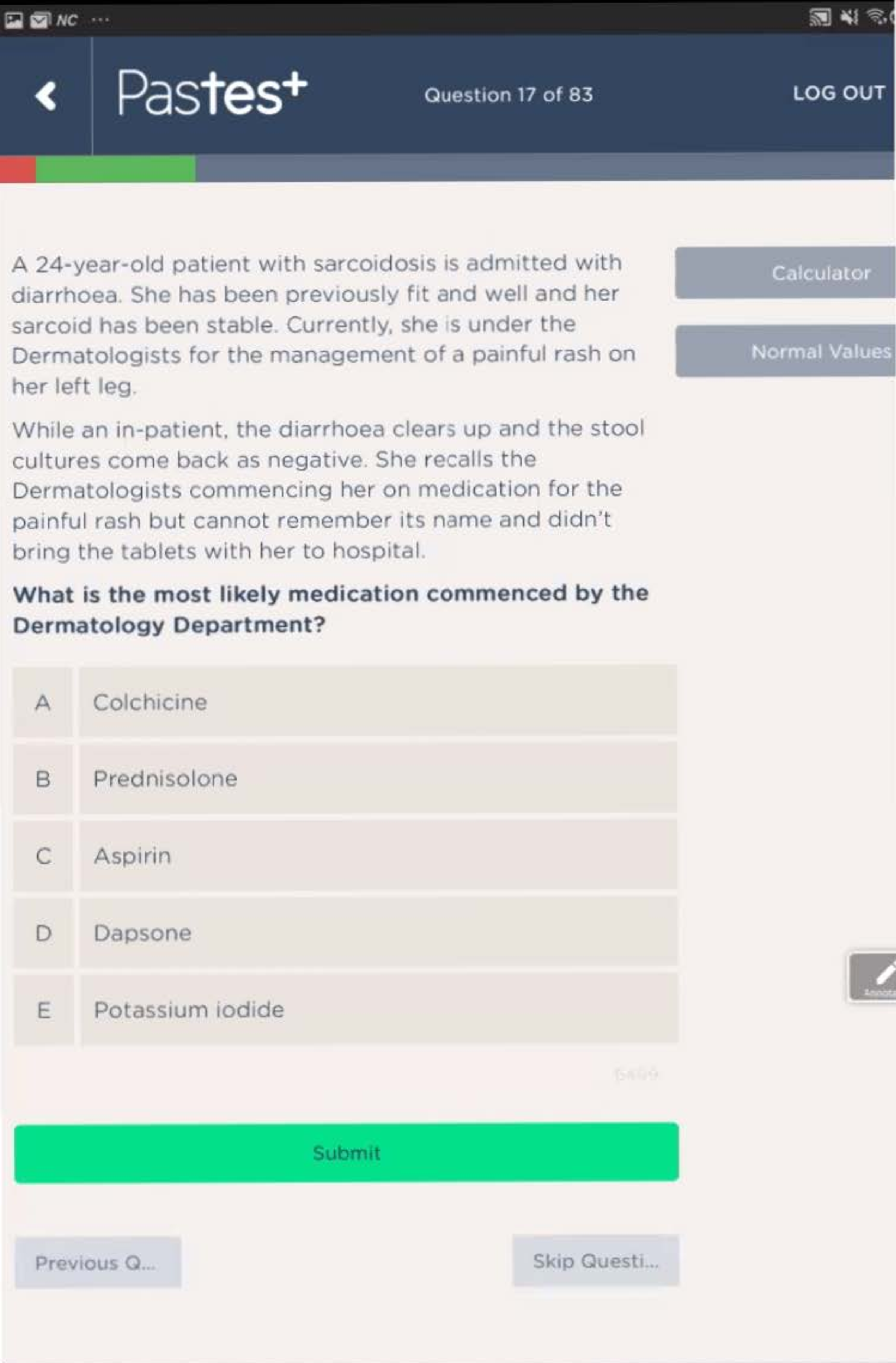
C Amiodarone-induced thyrotoxicosis (AIT) type 1

Type 1 is related to the excess iodine provided by amiodarone leading to excess production of thyroid hormone, often in the presence of latent thyroid disease related to another cause.

E Thyroid carcinoma

A specific thyroid mass would be elucidated on both the ultrasound scan and isotope investigation, and neither has raised a concern here.

Rana Alnasser's screen

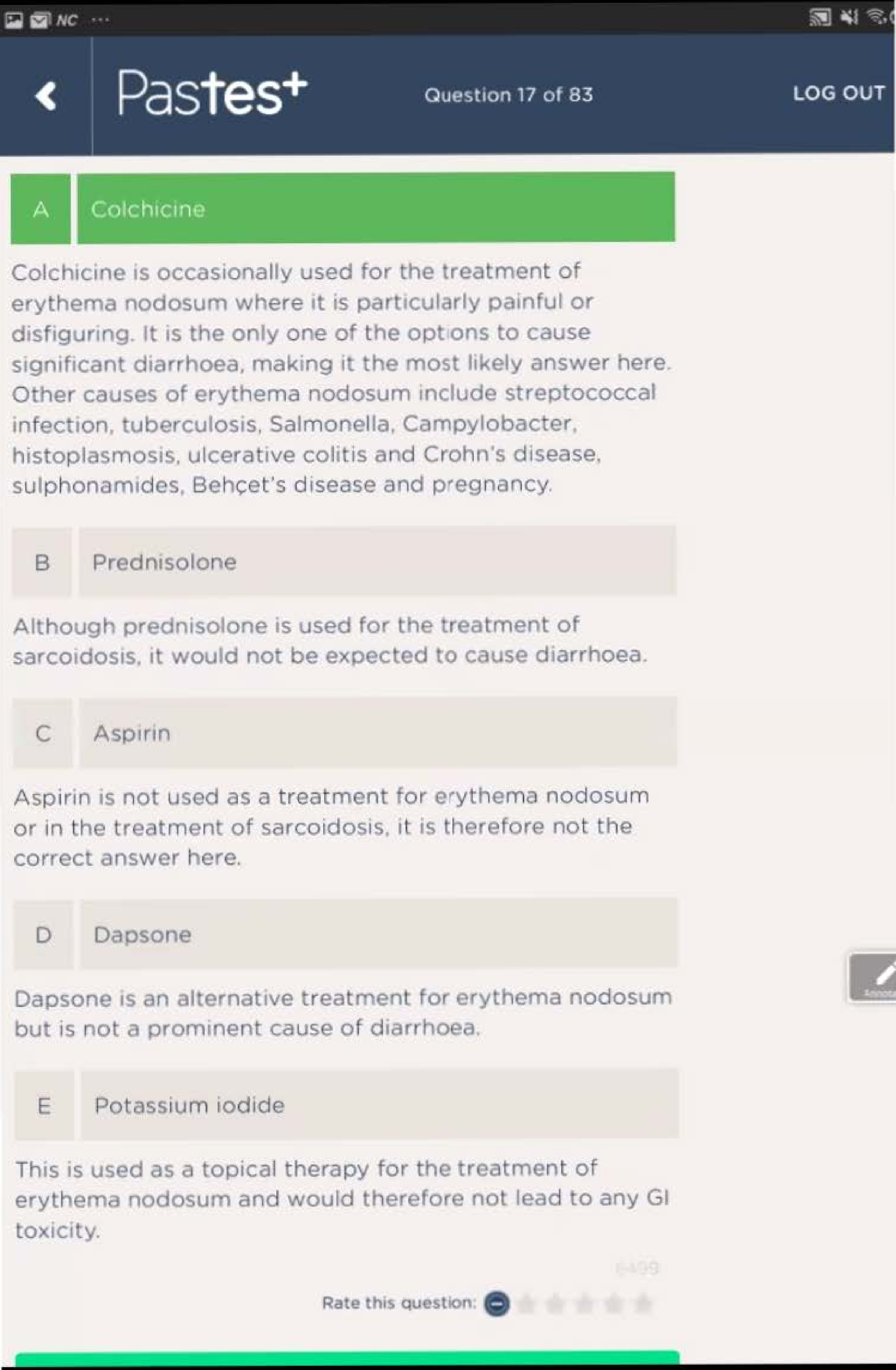


A 24-year-old patient with sarcoidosis is admitted with diarrhoea. She has been previously fit and well and her sarcoid has been stable. Currently, she is under the Dermatologists for the management of a painful rash on her left leg.

While an in-patient, the diarrhoea clears up and the stool cultures come back as negative. She recalls the Dermatologists commencing her on medication for the painful rash but cannot remember its name and didn't bring the tablets with her to hospital.

What is the most likely medication commenced by the Dermatology Department?

A Colchicine
B Prednisolone
C Aspirin
D Dapsone
E Potassium iodide



Question 17 of 83

A Colchicine

Colchicine is occasionally used for the treatment of erythema nodosum where it is particularly painful or disfiguring. It is the only one of the options to cause significant diarrhoea, making it the most likely answer here. Other causes of erythema nodosum include streptococcal infection, tuberculosis, Salmonella, Campylobacter, histoplasmosis, ulcerative colitis and Crohn's disease, sulphonamides, Behçet's disease and pregnancy.

B Prednisolone

Although prednisolone is used for the treatment of sarcoidosis, it would not be expected to cause diarrhoea.

C Aspirin

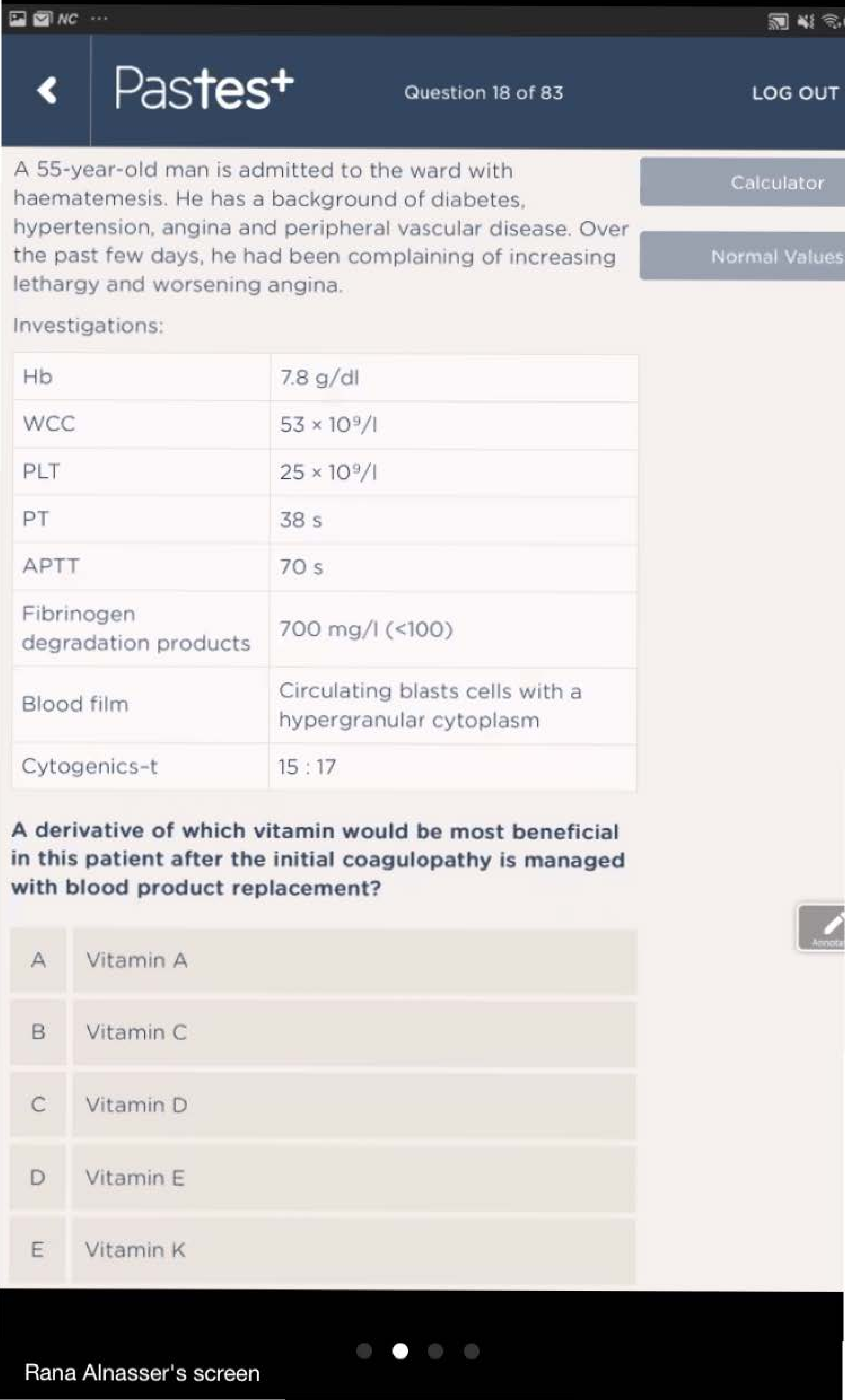
Aspirin is not used as a treatment for erythema nodosum or in the treatment of sarcoidosis, it is therefore not the correct answer here.

D Dapsone

Dapsone is an alternative treatment for erythema nodosum but is not a prominent cause of diarrhoea.

E Potassium iodide

This is used as a topical therapy for the treatment of erythema nodosum and would therefore not lead to any GI toxicity.



A 55-year-old man is admitted to the ward with haematemesis. He has a background of diabetes, hypertension, angina and peripheral vascular disease. Over the past few days, he had been complaining of increasing lethargy and worsening angina.

Investigations:

Hb	7.8 g/dl
WCC	53 × 10^9/l
PLT	25 × 10^9/l
PT	38 s
APTT	70 s
Fibrinogen degradation products	700 mg/l (<100)
Blood film	Circulating blasts cells with a hypergranular cytoplasm
Cytogenics-t	15 : 17

A derivative of which vitamin would be most beneficial in this patient after the initial coagulopathy is managed with blood product replacement?

A Vitamin A

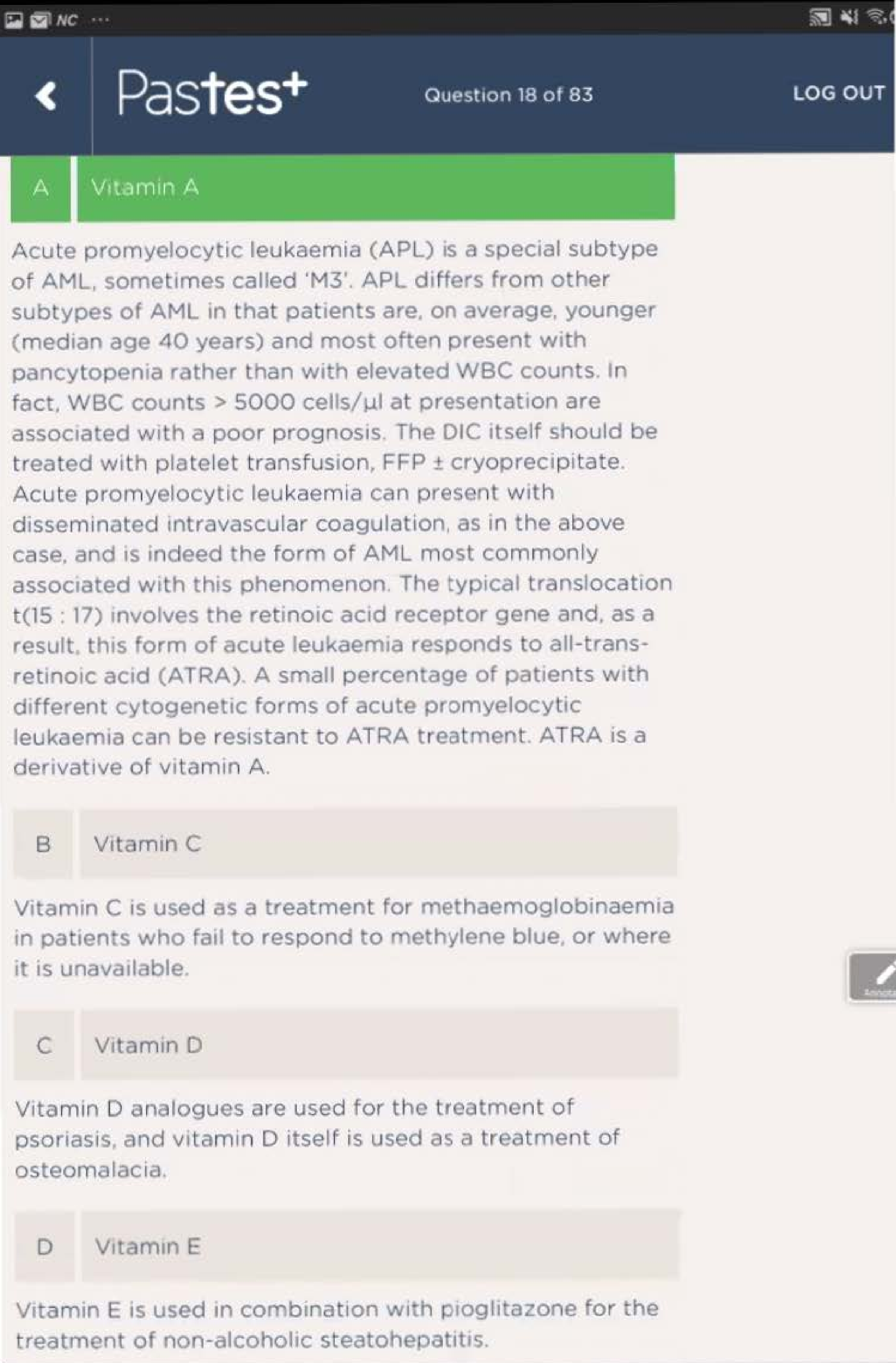
B Vitamin C

C Vitamin D

D Vitamin E

E Vitamin K

Rana Alnasser's screen



A Vitamin A

Acute promyelocytic leukaemia (APL) is a special subtype of AML, sometimes called 'M3'. APL differs from other subtypes of AML in that patients are, on average, younger (median age 40 years) and most often present with pancytopenia rather than with elevated WBC counts. In fact, WBC counts > 5000 cells/µl at presentation are associated with a poor prognosis. The DIC itself should be treated with platelet transfusion, FFP ± cryoprecipitate. Acute promyelocytic leukaemia can present with disseminated intravascular coagulation, as in the above case, and is indeed the form of AML most commonly associated with this phenomenon. The typical translocation t(15 : 17) involves the retinoic acid receptor gene and, as a result, this form of acute leukaemia responds to all-trans-retinoic acid (ATRA). A small percentage of patients with different cytogenetic forms of acute promyelocytic leukaemia can be resistant to ATRA treatment. ATRA is a derivative of vitamin A.

B Vitamin C

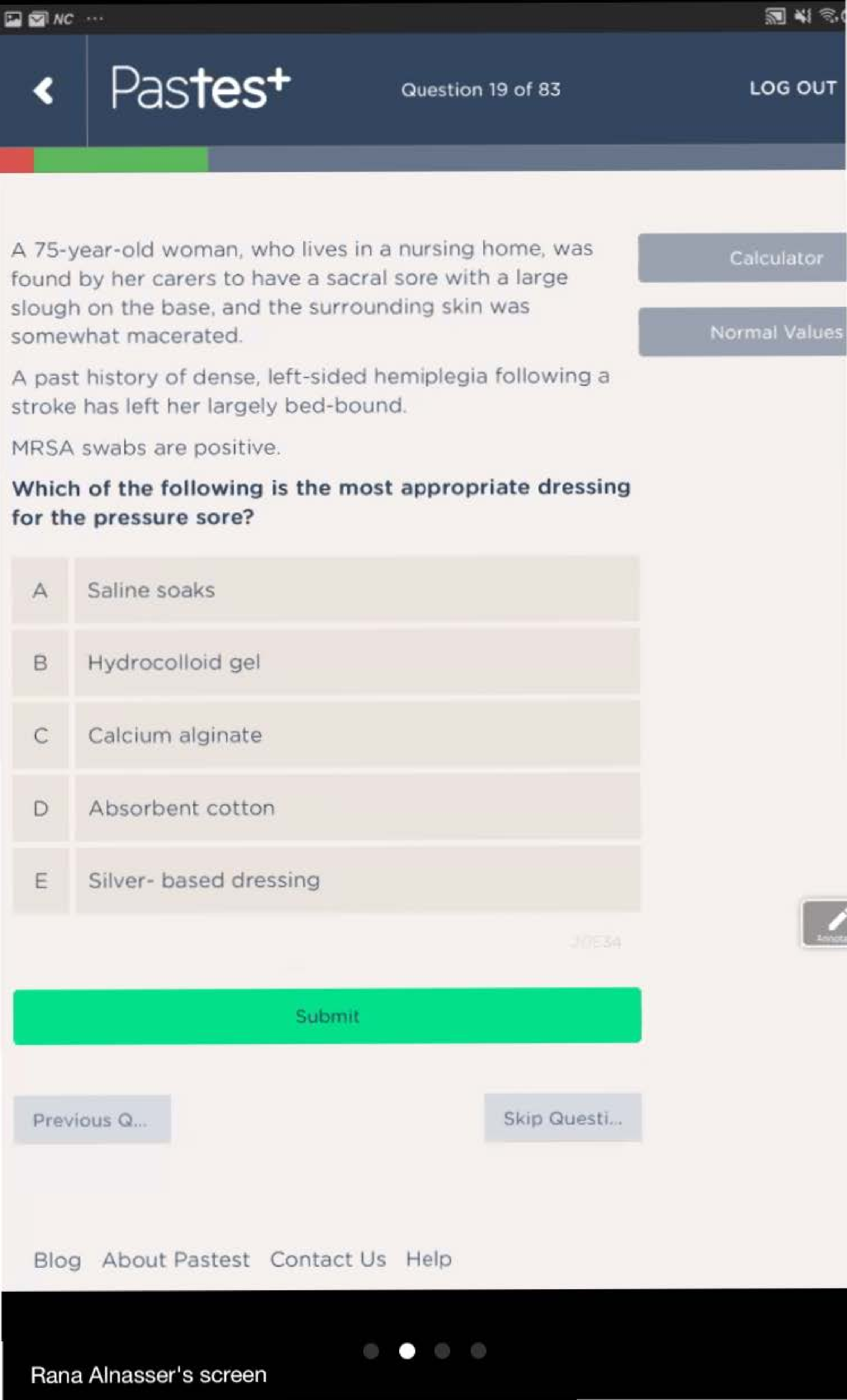
Vitamin C is used as a treatment for methaemoglobinaemia in patients who fail to respond to methylene blue, or where it is unavailable.

C Vitamin D

Vitamin D analogues are used for the treatment of psoriasis, and vitamin D itself is used as a treatment of osteomalacia.

D Vitamin E

Vitamin E is used in combination with pioglitazone for the treatment of non-alcoholic steatohepatitis.



A 75-year-old woman, who lives in a nursing home, was found by her carers to have a sacral sore with a large slough on the base, and the surrounding skin was somewhat macerated.

A past history of dense, left-sided hemiplegia following a stroke has left her largely bed-bound.

MRSA swabs are positive.

Which of the following is the most appropriate dressing for the pressure sore?

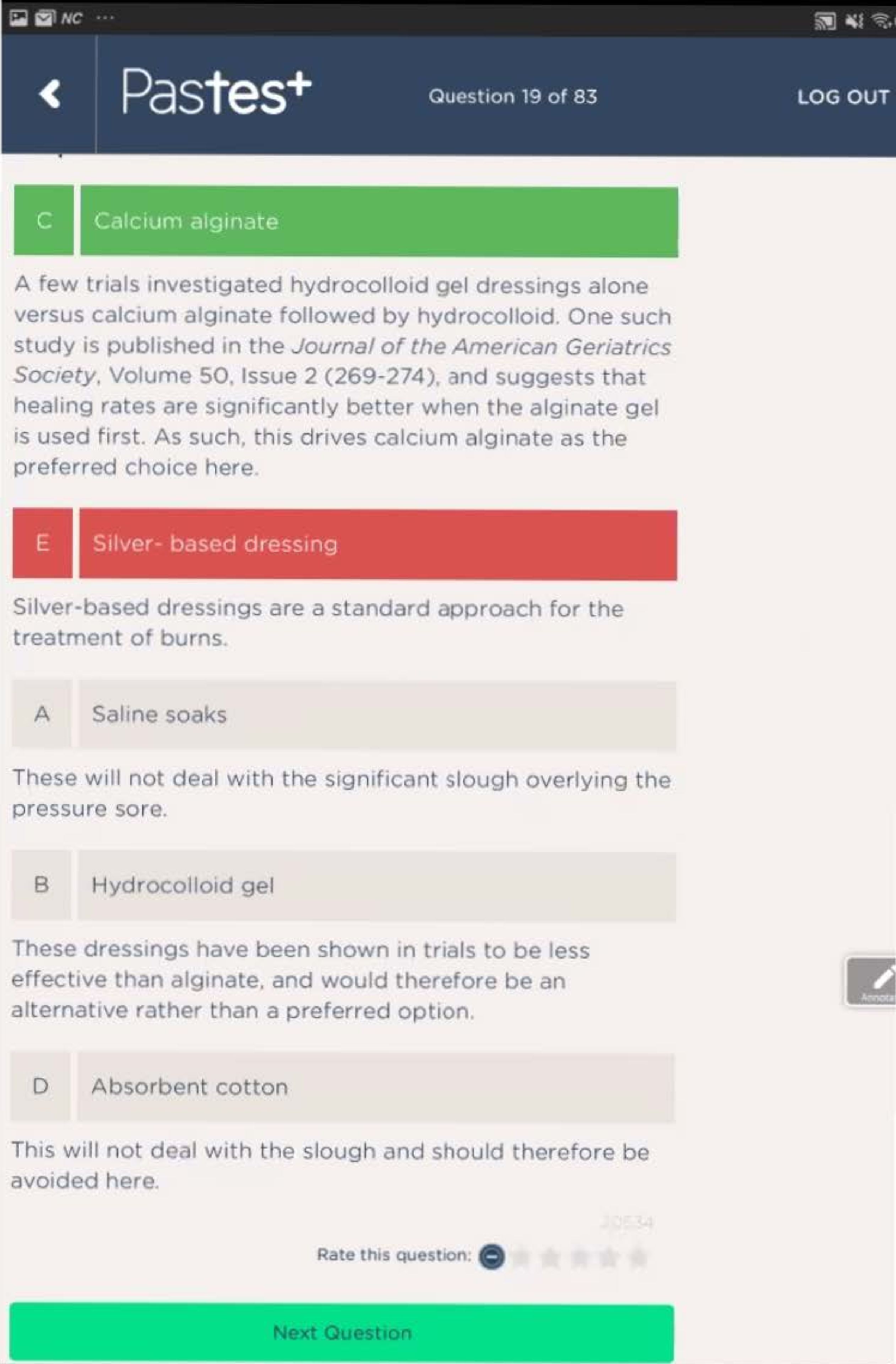
A Saline soaks

B Hydrocolloid gel

C Calcium alginate

D Absorbent cotton

E Silver- based dressing



C Calcium alginate

A few trials investigated hydrocolloid gel dressings alone versus calcium alginate followed by hydrocolloid. One such study is published in the *Journal of the American Geriatrics Society*, Volume 50, Issue 2 (269-274), and suggests that healing rates are significantly better when the alginate gel is used first. As such, this drives calcium alginate as the preferred choice here.

E Silver- based dressing

Silver-based dressings are a standard approach for the treatment of burns.

A Saline soaks

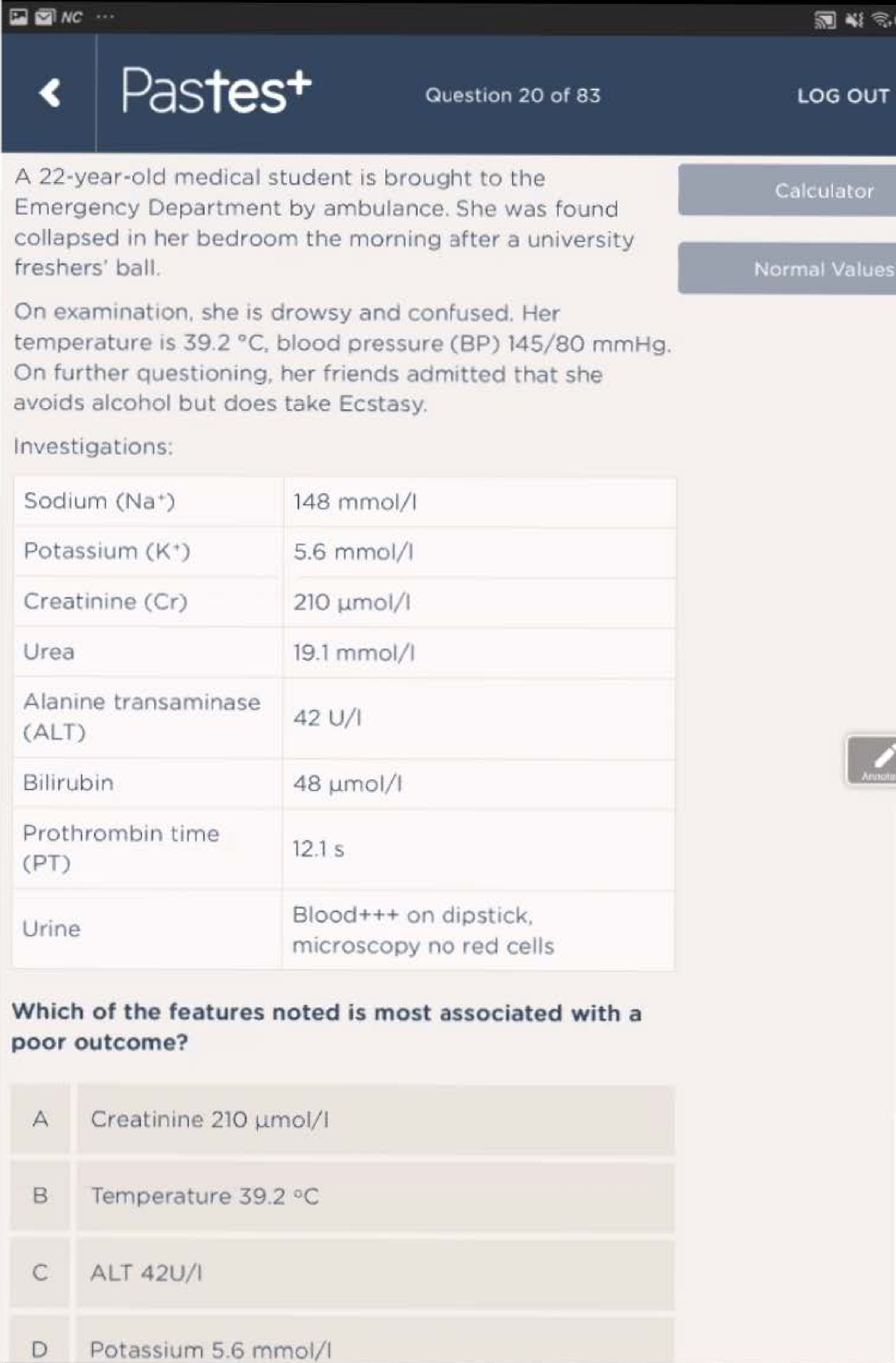
These will not deal with the significant slough overlying the pressure sore.

B Hydrocolloid gel

These dressings have been shown in trials to be less effective than alginate, and would therefore be an alternative rather than a preferred option.

D Absorbent cotton

This will not deal with the slough and should therefore be avoided here.



A 22-year-old medical student is brought to the Emergency Department by ambulance. She was found collapsed in her bedroom the morning after a university freshers' ball.

On examination, she is drowsy and confused. Her temperature is 39.2 °C, blood pressure (BP) 145/80 mmHg. On further questioning, her friends admitted that she avoids alcohol but does take Ecstasy.

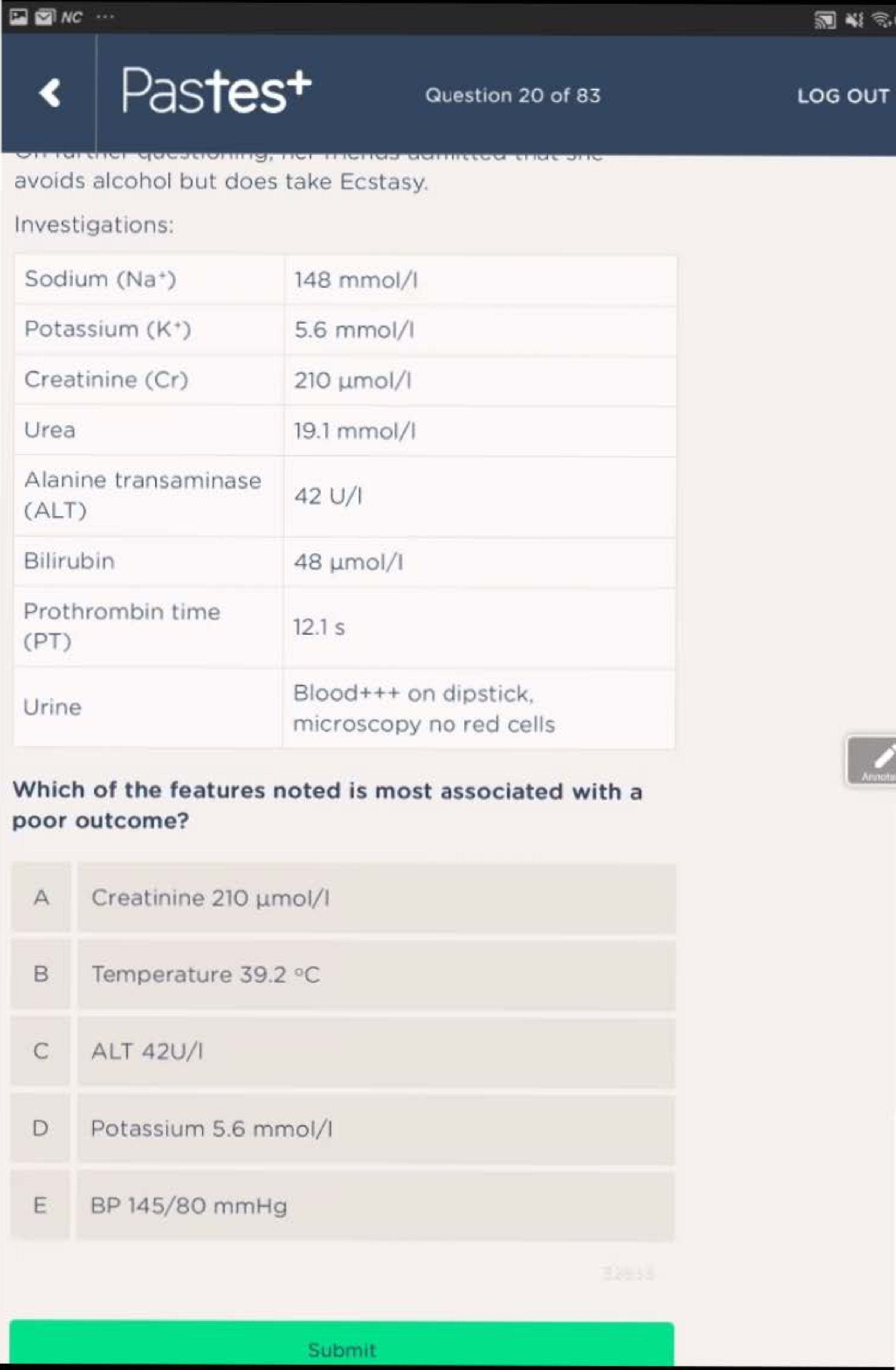
Investigations:

Sodium (Na^+)	148 mmol/l
Potassium (K^+)	5.6 mmol/l
Creatinine (Cr)	210 µmol/l
Urea	19.1 mmol/l
Alanine transaminase (ALT)	42 U/l
Bilirubin	48 µmol/l
Prothrombin time (PT)	12.1 s
Urine	Blood+++ on dipstick, microscopy no red cells

Which of the features noted is most associated with a poor outcome?

A	Creatinine 210 µmol/l
B	Temperature 39.2 °C
C	ALT 42U/l
D	Potassium 5.6 mmol/l

Rana Alnasser's screen



avoids alcohol but does take Ecstasy.

Investigations:

Sodium (Na^+)	148 mmol/l
Potassium (K^+)	5.6 mmol/l
Creatinine (Cr)	210 µmol/l
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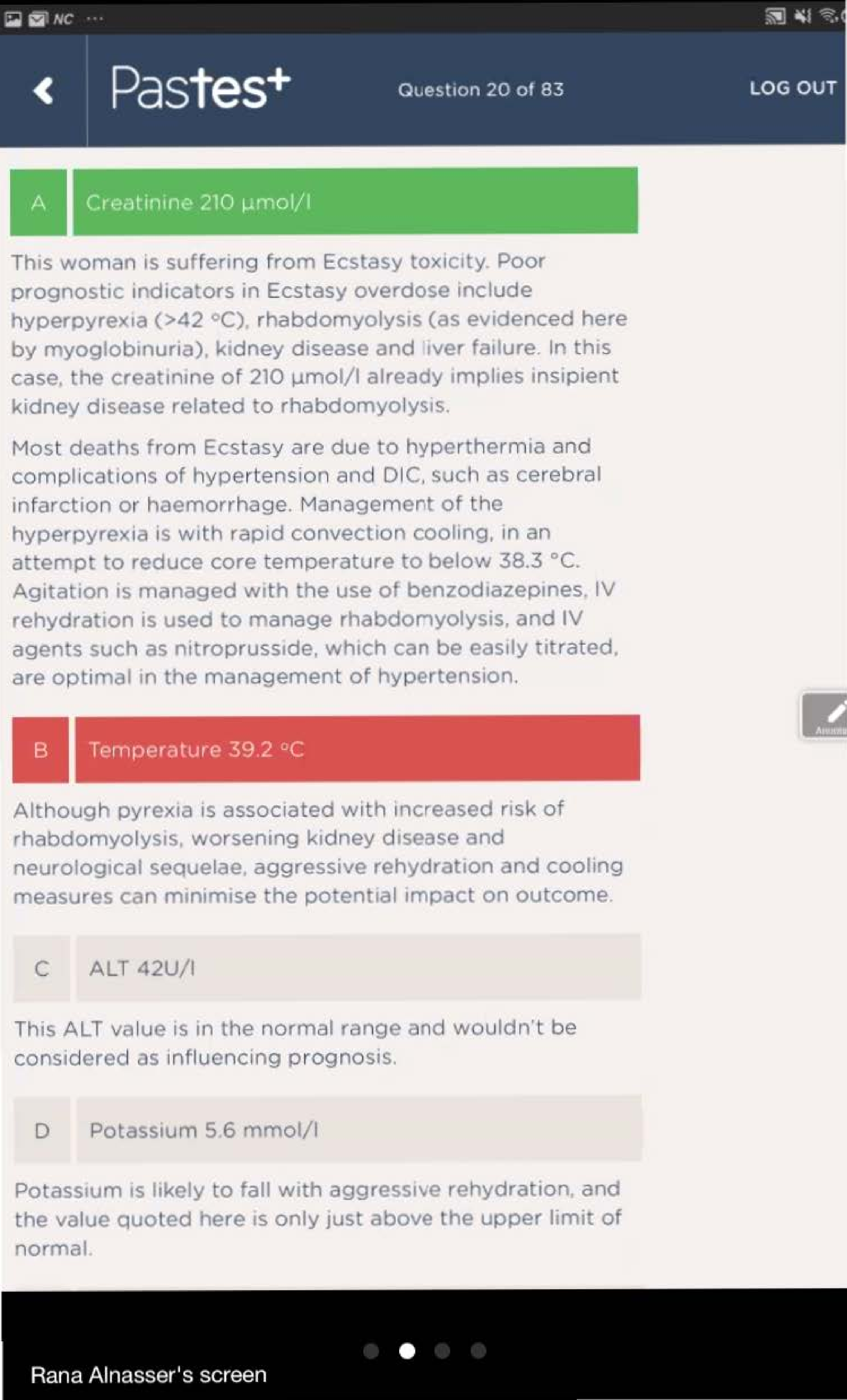
Which of the features noted is most associated with a poor outcome?

A Creatinine 210 µmol/l
B Temperature 39.2 °C
C ALT 42U/l
D Potassium 5.6 mmol/l
E BP 145/80 mmHg



A Creatinine 210 µmol/l

This woman is suffering from Ecstasy toxicity. Poor prognostic indicators in Ecstasy overdose include hyperpyrexia (>42 °C), rhabdomyolysis (as evidenced here by myoglobinuria), kidney disease and liver failure. In this case, the creatinine of 210 µmol/l already implies insipient kidney disease related to rhabdomyolysis.

Most deaths from Ecstasy are due to hyperthermia and complications of hypertension and DIC, such as cerebral infarction or haemorrhage. Management of the hyperpyrexia is with rapid convection cooling, in an attempt to reduce core temperature to below 38.3 °C. Agitation is managed with the use of benzodiazepines, IV rehydration is used to manage rhabdomyolysis, and IV agents such as nitroprusside, which can be easily titrated, are optimal in the management of hypertension.

B Temperature 39.2 °C

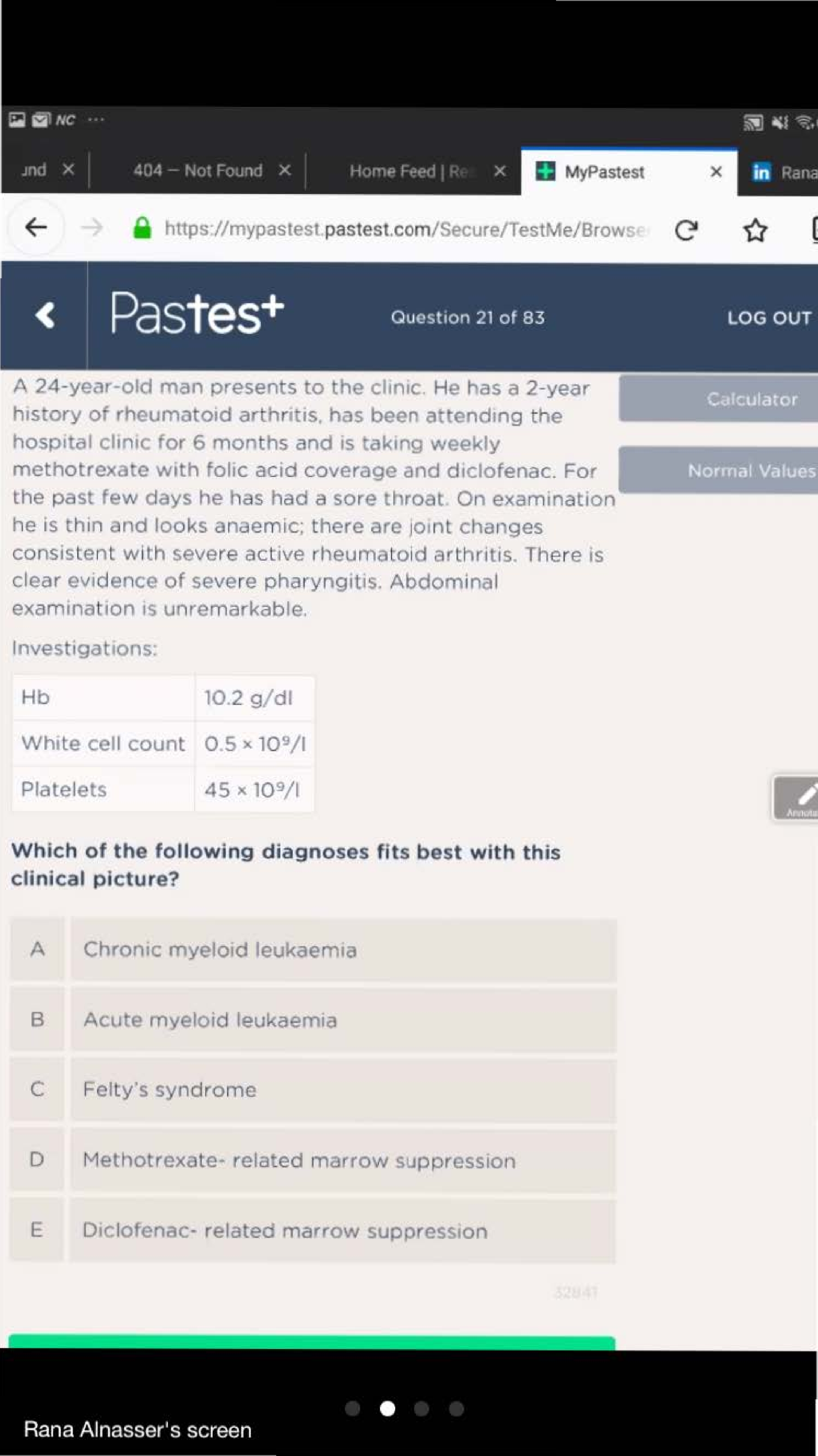
Although pyrexia is associated with increased risk of rhabdomyolysis, worsening kidney disease and neurological sequelae, aggressive rehydration and cooling measures can minimise the potential impact on outcome.

C ALT 42U/l

This ALT value is in the normal range and wouldn't be considered as influencing prognosis.

D Potassium 5.6 mmol/l

Potassium is likely to fall with aggressive rehydration, and the value quoted here is only just above the upper limit of normal.



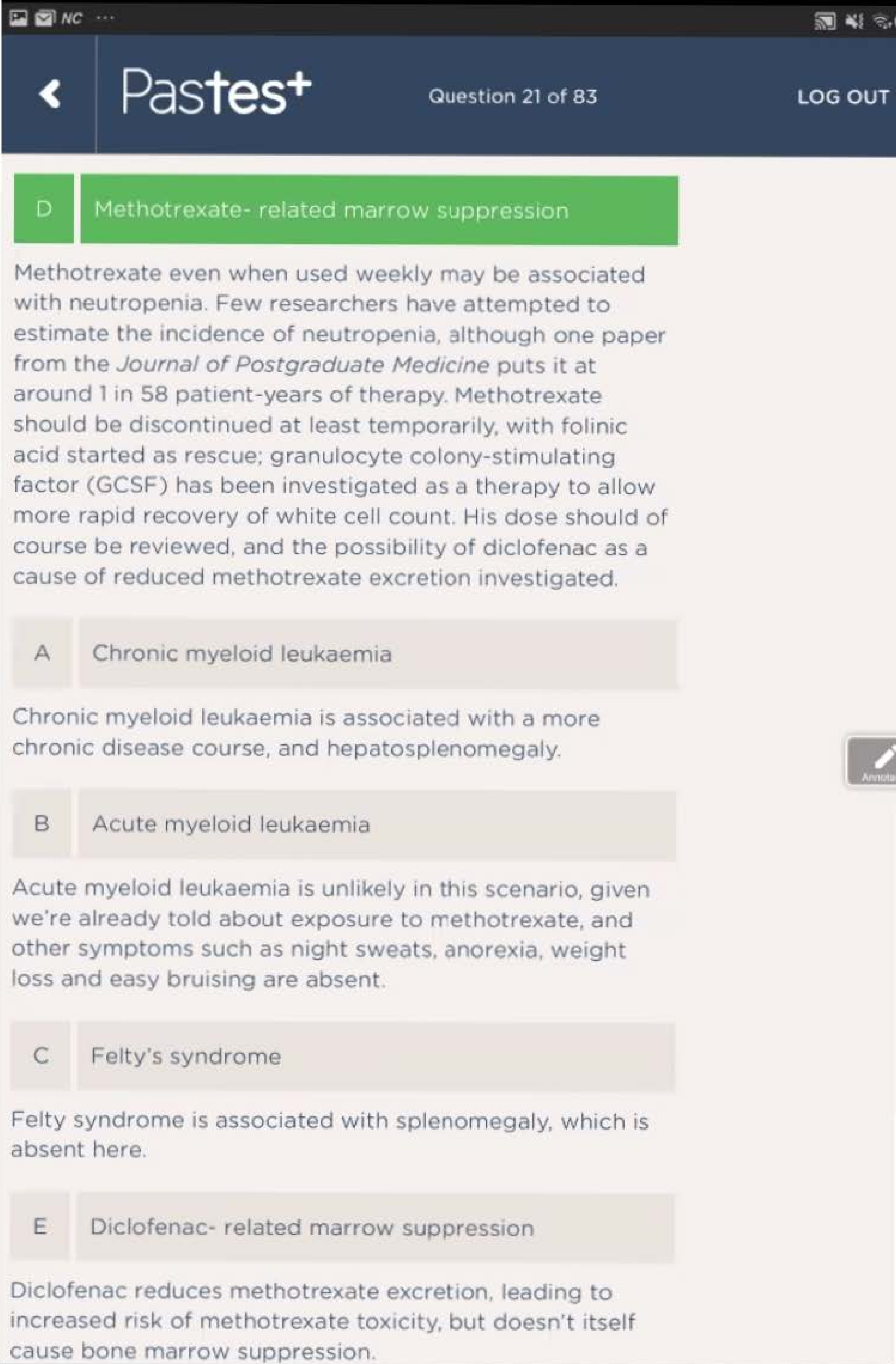
A 24-year-old man presents to the clinic. He has a 2-year history of rheumatoid arthritis, has been attending the hospital clinic for 6 months and is taking weekly methotrexate with folic acid coverage and diclofenac. For the past few days he has had a sore throat. On examination he is thin and looks anaemic; there are joint changes consistent with severe active rheumatoid arthritis. There is clear evidence of severe pharyngitis. Abdominal examination is unremarkable.

Investigations:

Hb	10.2 g/dl
White cell count	0.5×10^9/l
Platelets	45×10^9/l

Which of the following diagnoses fits best with this clinical picture?

A	Chronic myeloid leukaemia
B	Acute myeloid leukaemia
C	Felty's syndrome
D	Methotrexate- related marrow suppression
E	Diclofenac- related marrow suppression



D Methotrexate- related marrow suppression

Methotrexate even when used weekly may be associated with neutropenia. Few researchers have attempted to estimate the incidence of neutropenia, although one paper from the *Journal of Postgraduate Medicine* puts it at around 1 in 58 patient-years of therapy. Methotrexate should be discontinued at least temporarily, with folinic acid started as rescue; granulocyte colony-stimulating factor (GCSF) has been investigated as a therapy to allow more rapid recovery of white cell count. His dose should of course be reviewed, and the possibility of diclofenac as a cause of reduced methotrexate excretion investigated.

A Chronic myeloid leukaemia

Chronic myeloid leukaemia is associated with a more chronic disease course, and hepatosplenomegaly.

B Acute myeloid leukaemia

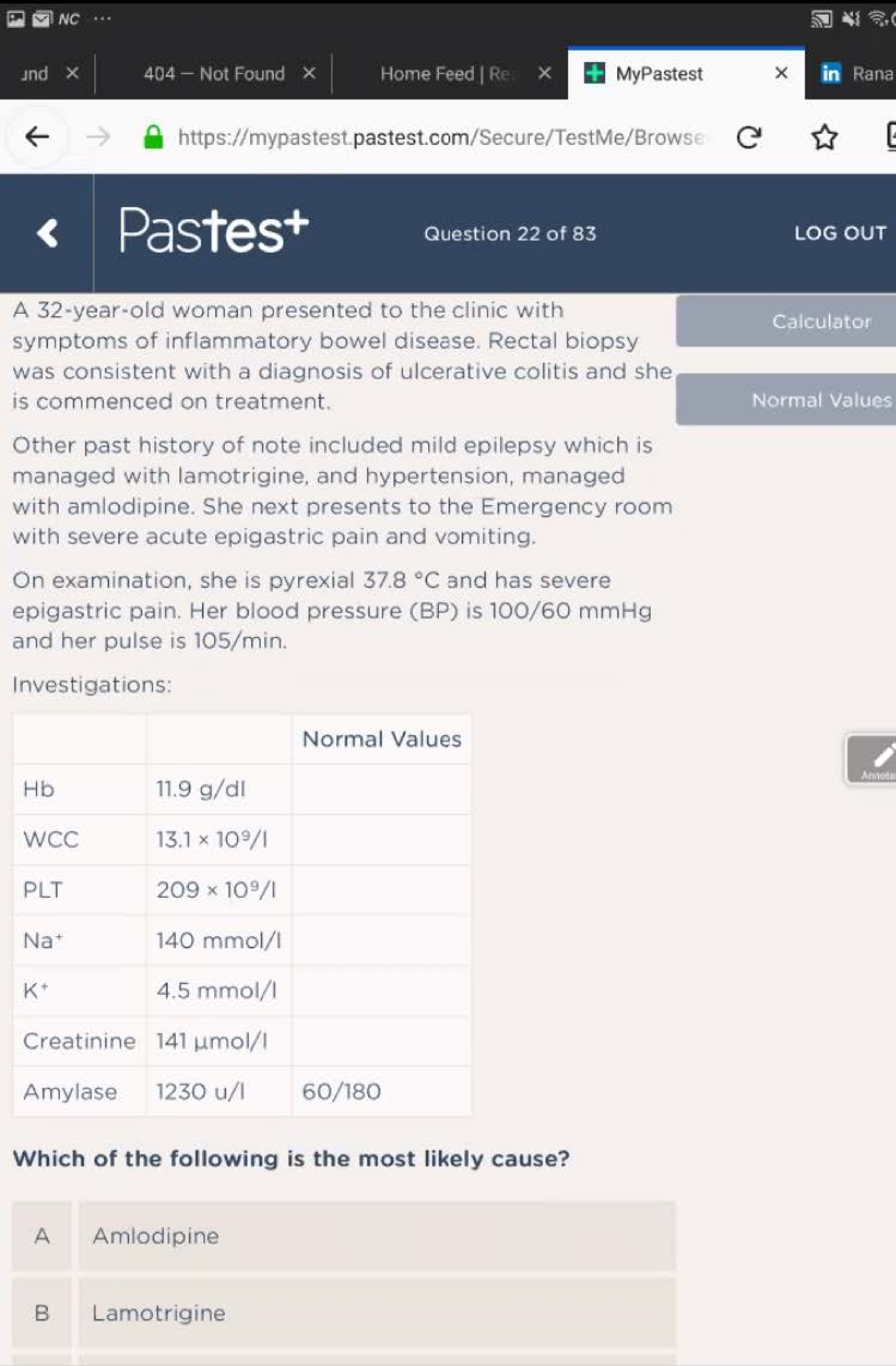
Acute myeloid leukaemia is unlikely in this scenario, given we're already told about exposure to methotrexate, and other symptoms such as night sweats, anorexia, weight loss and easy bruising are absent.

C Felty's syndrome

Felty syndrome is associated with splenomegaly, which is absent here.

E Diclofenac- related marrow suppression

Diclofenac reduces methotrexate excretion, leading to increased risk of methotrexate toxicity, but doesn't itself cause bone marrow suppression.



A 32-year-old woman presented to the clinic with symptoms of inflammatory bowel disease. Rectal biopsy was consistent with a diagnosis of ulcerative colitis and she is commenced on treatment.

Other past history of note included mild epilepsy which is managed with lamotrigine, and hypertension, managed with amlodipine. She next presents to the Emergency room with severe acute epigastric pain and vomiting.

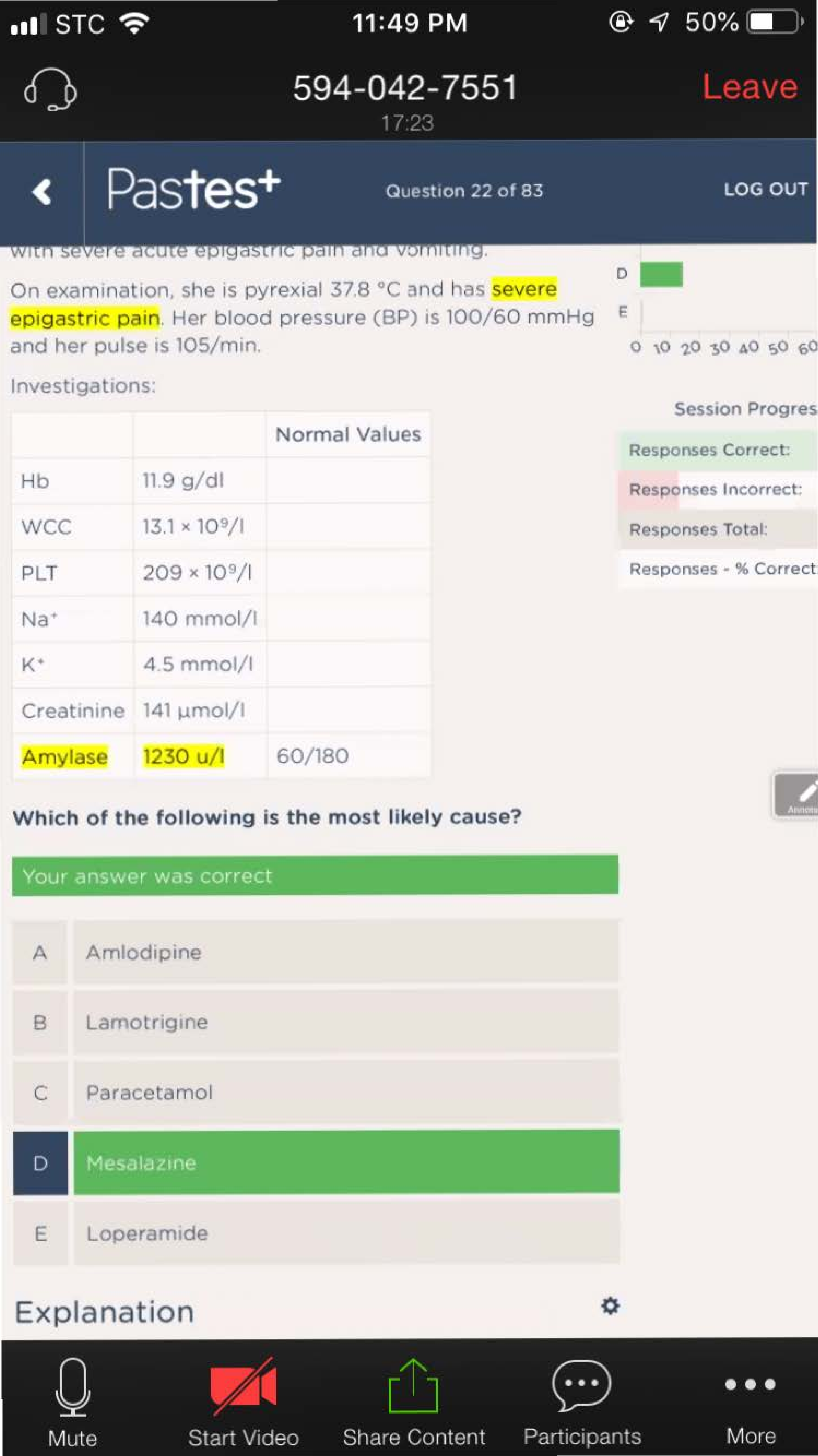
On examination, she is pyrexial 37.8 °C and has severe epigastric pain. Her blood pressure (BP) is 100/60 mmHg and her pulse is 105/min.

Investigations:

		Normal Values
Hb	11.9 g/dl	
WCC	13.1×10^9/l	
PLT	209×10^9/l	
Na^+	140 mmol/l	
K^+	4.5 mmol/l	
Creatinine	141 µmol/l	
Amylase	1230 u/l	60/180

Which of the following is the most likely cause?

A	Amlodipine
B	Lamotrigine



with severe acute epigastric pain and vomiting.

On examination, she is pyrexial 37.8 °C and has severe epigastric pain. Her blood pressure (BP) is 100/60 mmHg and her pulse is 105/min.

Investigations:

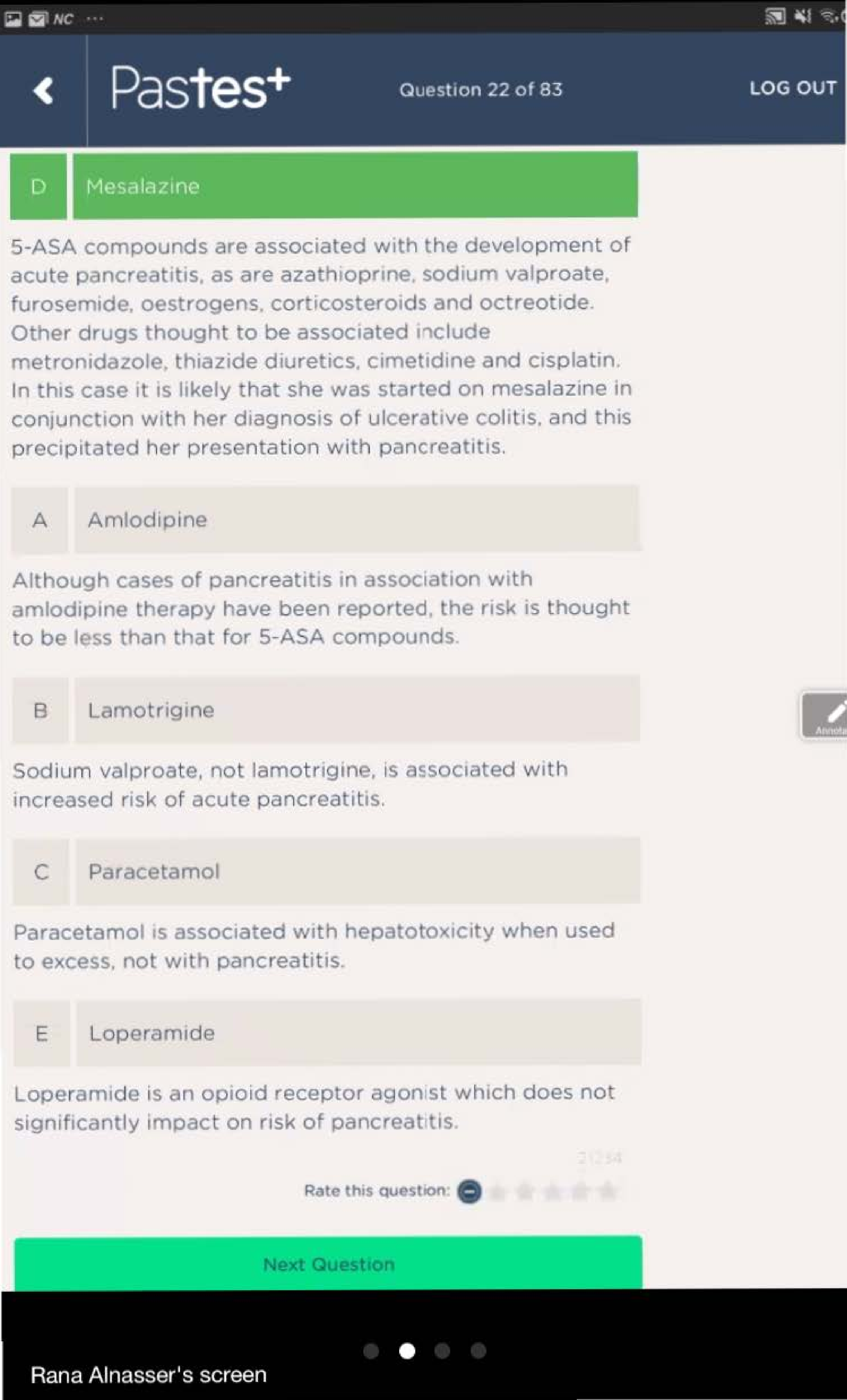
		Normal Values
Hb	11.9 g/dl	
WCC	13.1×10^9/l	
PLT	209×10^9/l	
Na^+	140 mmol/l	
K^+	4.5 mmol/l	
Creatinine	141 µmol/l	
Amylase	1230 u/l	60/180

Which of the following is the most likely cause?

Your answer was correct

A	Amlodipine
B	Lamotrigine
C	Paracetamol
D	Mesalazine
E	Loperamide

Explanation



D Mesalazine

5-ASA compounds are associated with the development of acute pancreatitis, as are azathioprine, sodium valproate, furosemide, oestrogens, corticosteroids and octreotide. Other drugs thought to be associated include metronidazole, thiazide diuretics, cimetidine and cisplatin. In this case it is likely that she was started on mesalazine in conjunction with her diagnosis of ulcerative colitis, and this precipitated her presentation with pancreatitis.

A Amlodipine

Although cases of pancreatitis in association with amlodipine therapy have been reported, the risk is thought to be less than that for 5-ASA compounds.

B Lamotrigine

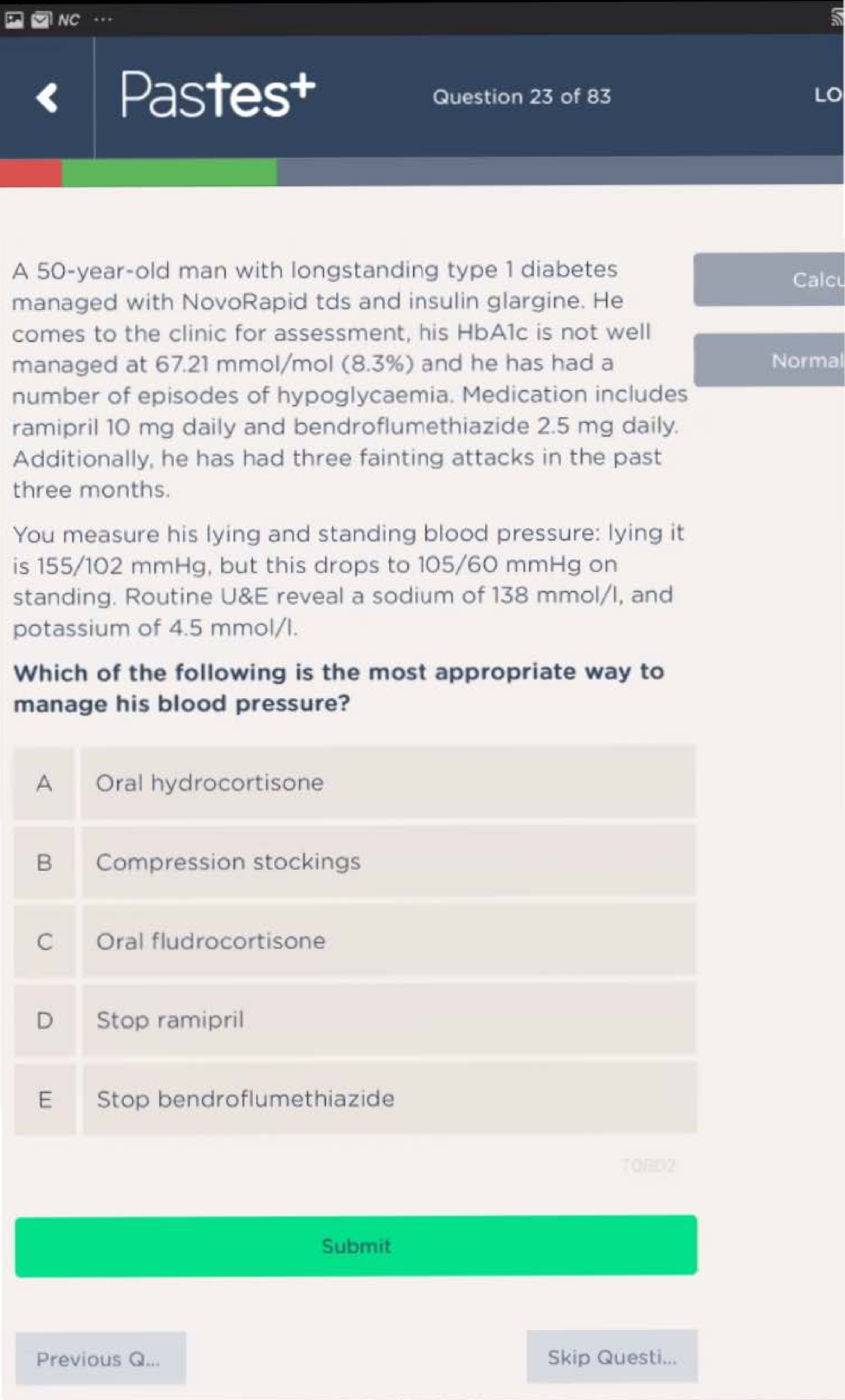
Sodium valproate, not lamotrigine, is associated with increased risk of acute pancreatitis.

C Paracetamol

Paracetamol is associated with hepatotoxicity when used to excess, not with pancreatitis.

E Loperamide

Loperamide is an opioid receptor agonist which does not significantly impact on risk of pancreatitis.

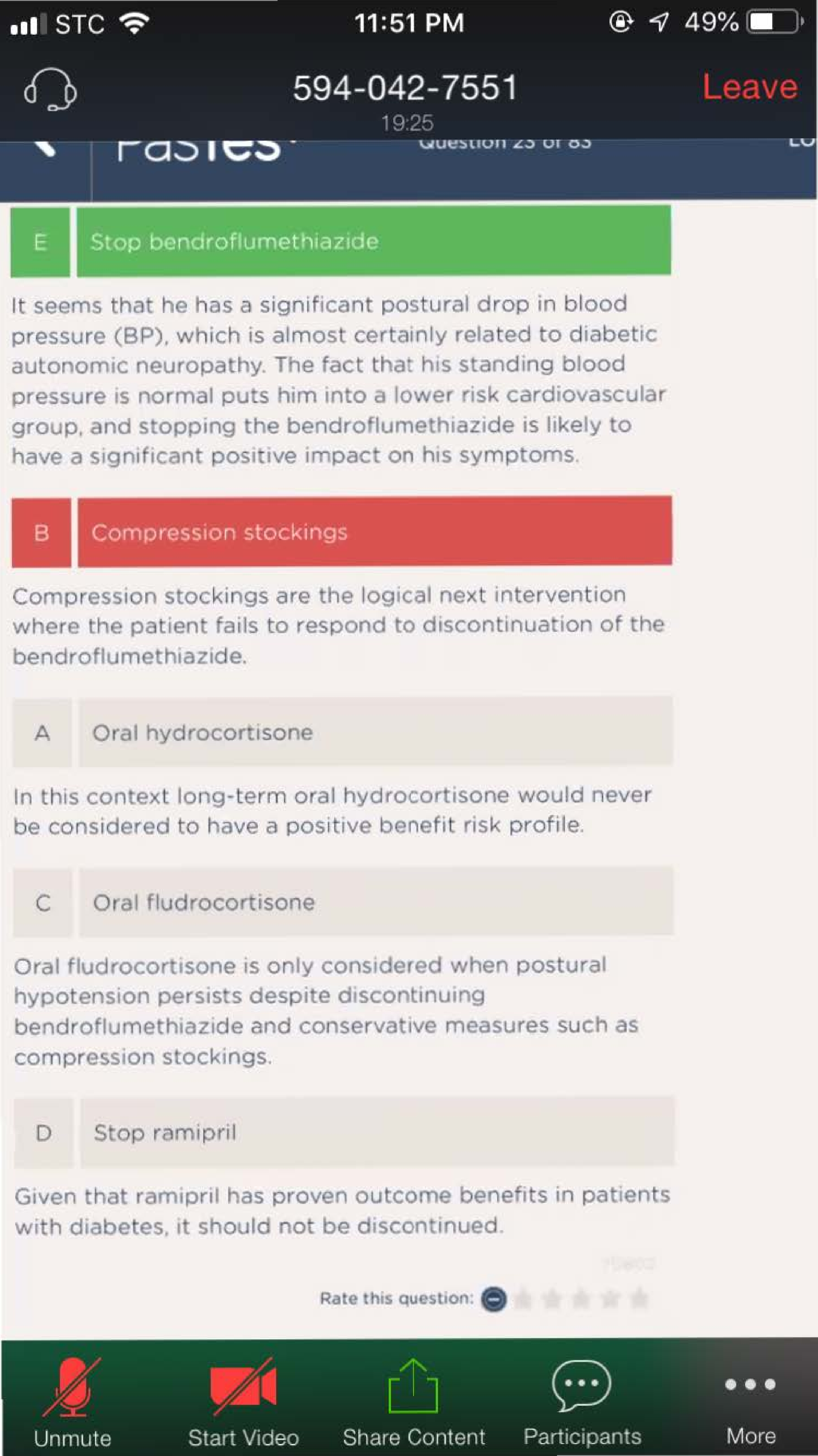


A 50-year-old man with longstanding type 1 diabetes managed with NovoRapid tds and insulin glargine. He comes to the clinic for assessment, his HbA1c is not well managed at 67.21 mmol/mol (8.3%) and he has had a number of episodes of hypoglycaemia. Medication includes ramipril 10 mg daily and bendroflumethiazide 2.5 mg daily. Additionally, he has had three fainting attacks in the past three months.

You measure his lying and standing blood pressure: lying it is 155/102 mmHg, but this drops to 105/60 mmHg on standing. Routine U&E reveal a sodium of 138 mmol/l, and potassium of 4.5 mmol/l.

Which of the following is the most appropriate way to manage his blood pressure?

A Oral hydrocortisone
B Compression stockings
C Oral fludrocortisone
D Stop ramipril
E Stop bendroflumethiazide



E Stop bendroflumethiazide

It seems that he has a significant postural drop in blood pressure (BP), which is almost certainly related to diabetic autonomic neuropathy. The fact that his standing blood pressure is normal puts him into a lower risk cardiovascular group, and stopping the bendroflumethiazide is likely to have a significant positive impact on his symptoms.

B Compression stockings

Compression stockings are the logical next intervention where the patient fails to respond to discontinuation of the bendroflumethiazide.

A Oral hydrocortisone

In this context long-term oral hydrocortisone would never be considered to have a positive benefit risk profile.

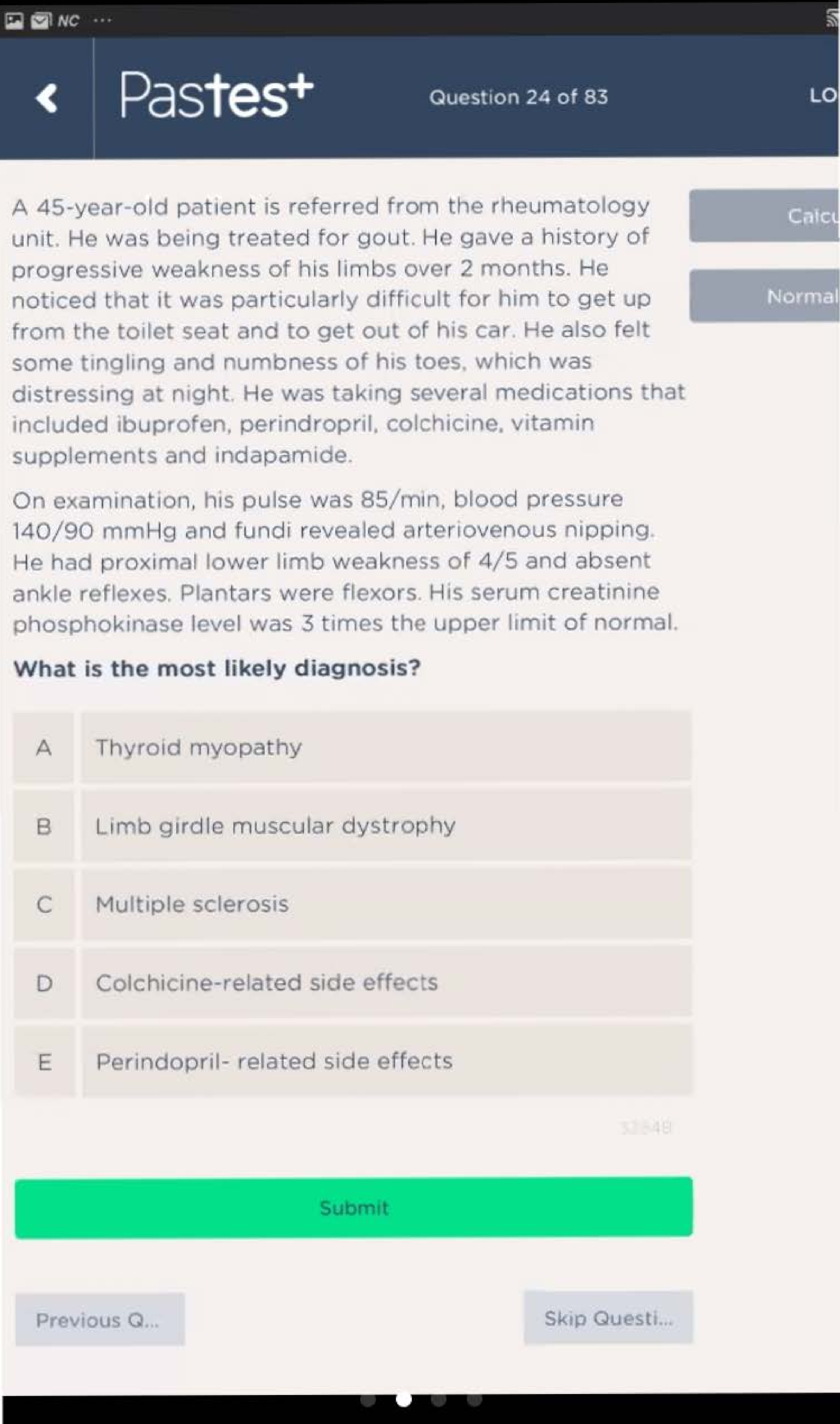
C Oral fludrocortisone

Oral fludrocortisone is only considered when postural hypotension persists despite discontinuing bendroflumethiazide and conservative measures such as compression stockings.

D Stop ramipril

Given that ramipril has proven outcome benefits in patients with diabetes, it should not be discontinued.

Rate this question: ☆☆☆☆☆

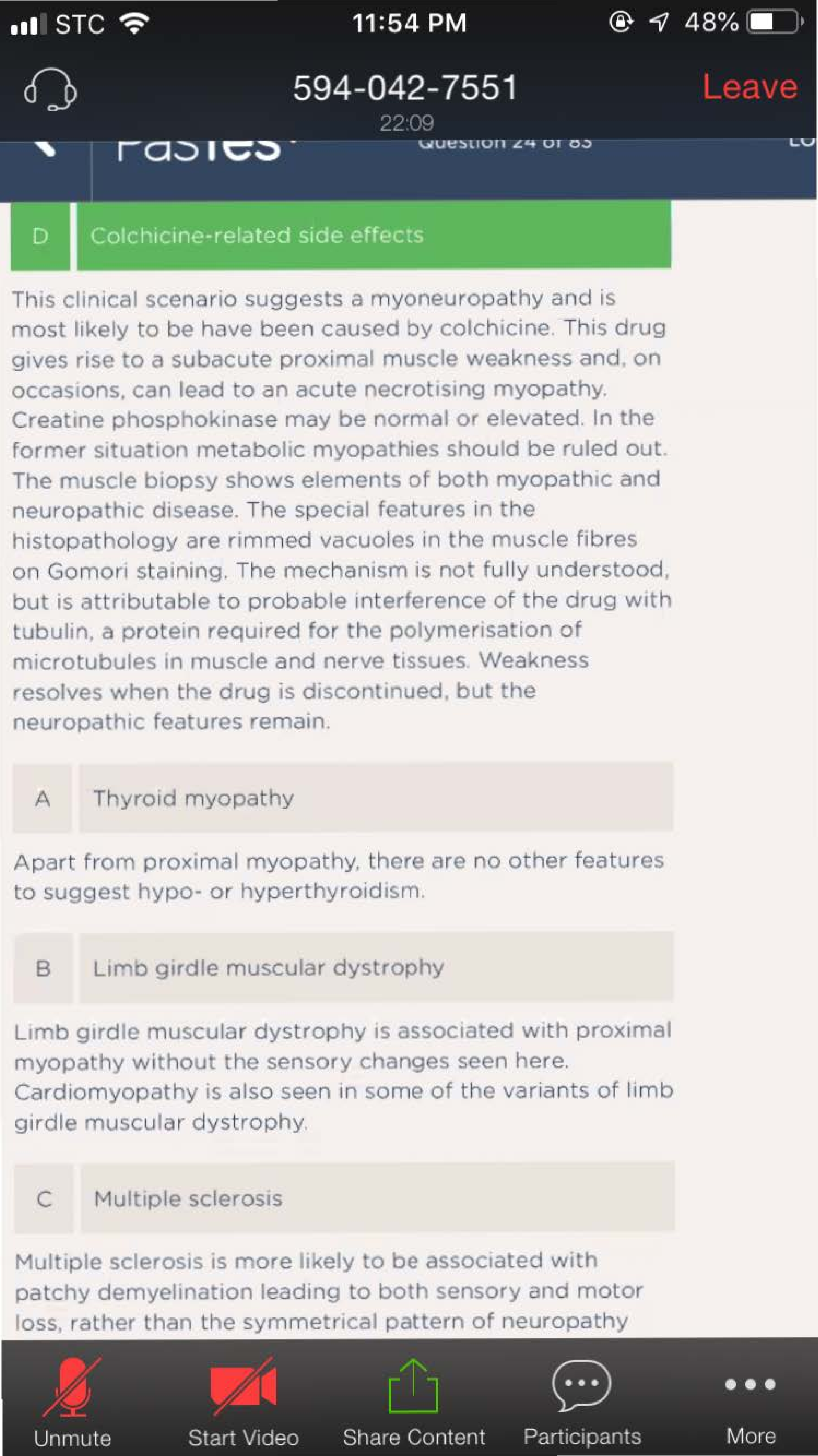


A 45-year-old patient is referred from the rheumatology unit. He was being treated for gout. He gave a history of progressive weakness of his limbs over 2 months. He noticed that it was particularly difficult for him to get up from the toilet seat and to get out of his car. He also felt some tingling and numbness of his toes, which was distressing at night. He was taking several medications that included ibuprofen, perindropril, colchicine, vitamin supplements and indapamide.

On examination, his pulse was 85/min, blood pressure 140/90 mmHg and fundi revealed arteriovenous nipping. He had proximal lower limb weakness of 4/5 and absent ankle reflexes. Plantars were flexors. His serum creatinine phosphokinase level was 3 times the upper limit of normal.

What is the most likely diagnosis?

A	Thyroid myopathy
B	Limb girdle muscular dystrophy
C	Multiple sclerosis
D	Colchicine-related side effects
E	Perindopril- related side effects



D Colchicine-related side effects

This clinical scenario suggests a myoneuropathy and is most likely to be have been caused by colchicine. This drug gives rise to a subacute proximal muscle weakness and, on occasions, can lead to an acute necrotising myopathy. Creatine phosphokinase may be normal or elevated. In the former situation metabolic myopathies should be ruled out. The muscle biopsy shows elements of both myopathic and neuropathic disease. The special features in the histopathology are rimmed vacuoles in the muscle fibres on Gomori staining. The mechanism is not fully understood, but is attributable to probable interference of the drug with tubulin, a protein required for the polymerisation of microtubules in muscle and nerve tissues. Weakness resolves when the drug is discontinued, but the neuropathic features remain.

A Thyroid myopathy

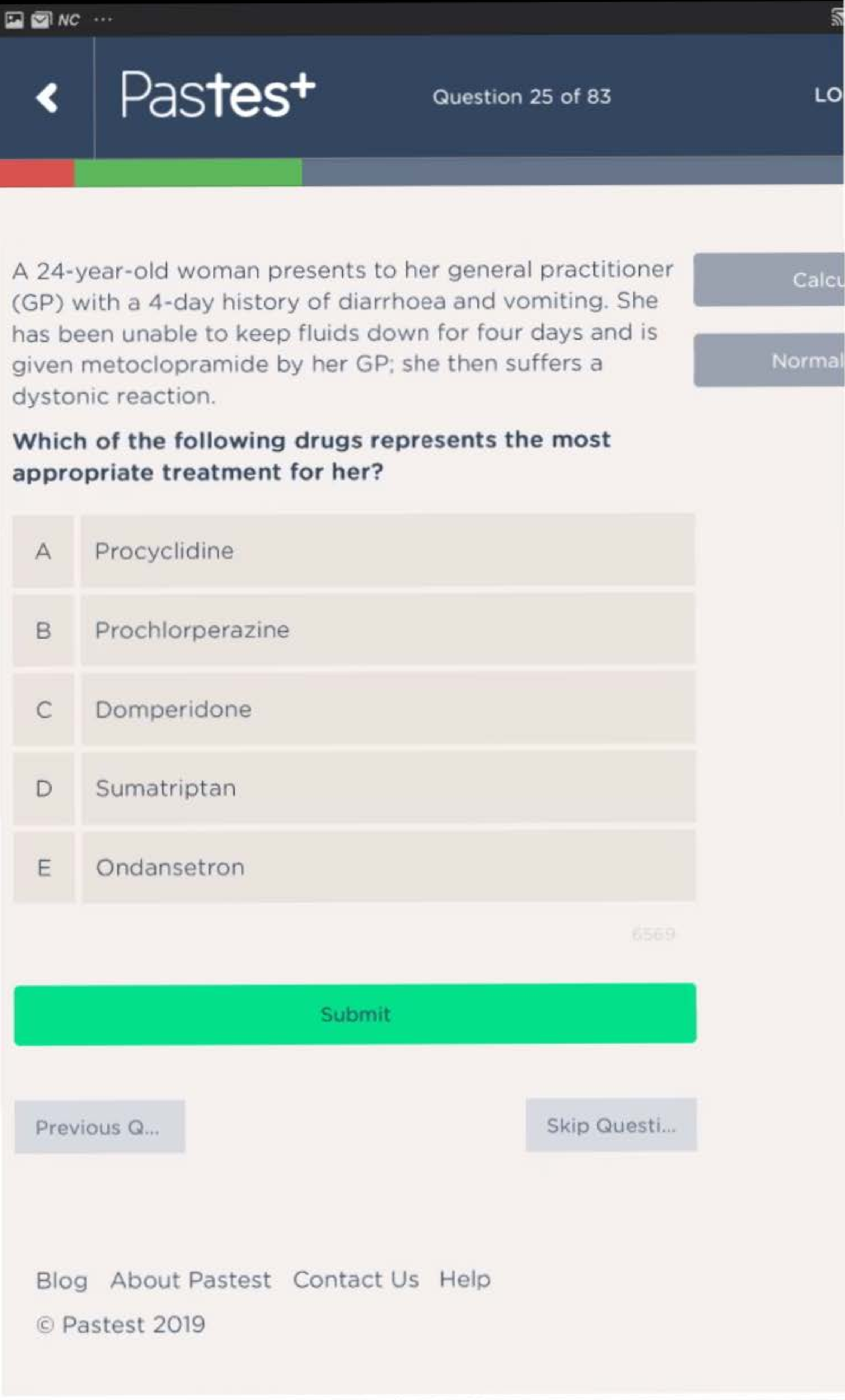
Apart from proximal myopathy, there are no other features to suggest hypo- or hyperthyroidism.

B Limb girdle muscular dystrophy

Limb girdle muscular dystrophy is associated with proximal myopathy without the sensory changes seen here. Cardiomyopathy is also seen in some of the variants of limb girdle muscular dystrophy.

C Multiple sclerosis

Multiple sclerosis is more likely to be associated with patchy demyelination leading to both sensory and motor loss, rather than the symmetrical pattern of neuropathy



A 24-year-old woman presents to her general practitioner (GP) with a 4-day history of diarrhoea and vomiting. She has been unable to keep fluids down for four days and is given metoclopramide by her GP; she then suffers a dystonic reaction.

Which of the following drugs represents the most appropriate treatment for her?

A	Procyclidine
B	Prochlorperazine
C	Domperidone
D	Sumatriptan
E	Ondansetron

6569

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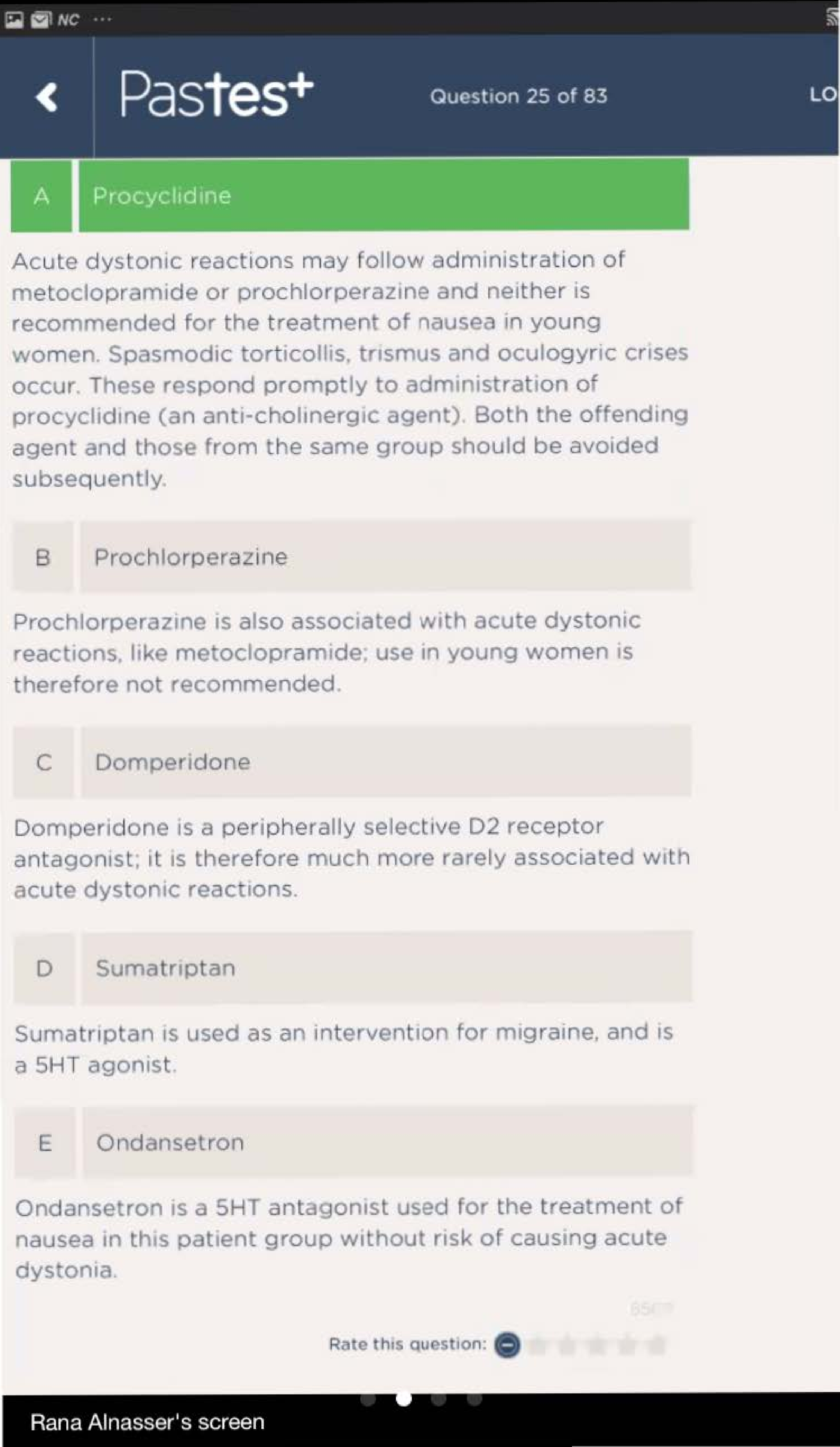


A Procyclidine

Acute dystonic reactions may follow administration of metoclopramide or prochlorperazine and neither is recommended for the treatment of nausea in young women. Spasmodic torticollis, trismus and oculogyric crises occur. These respond promptly to administration of procyclidine (an anti-cholinergic agent). Both the offending agent and those from the same group should be avoided subsequently.

B Prochlorperazine

Prochlorperazine is also associated with acute dystonic reactions, like metoclopramide; use in young women is therefore not recommended.

C Domperidone

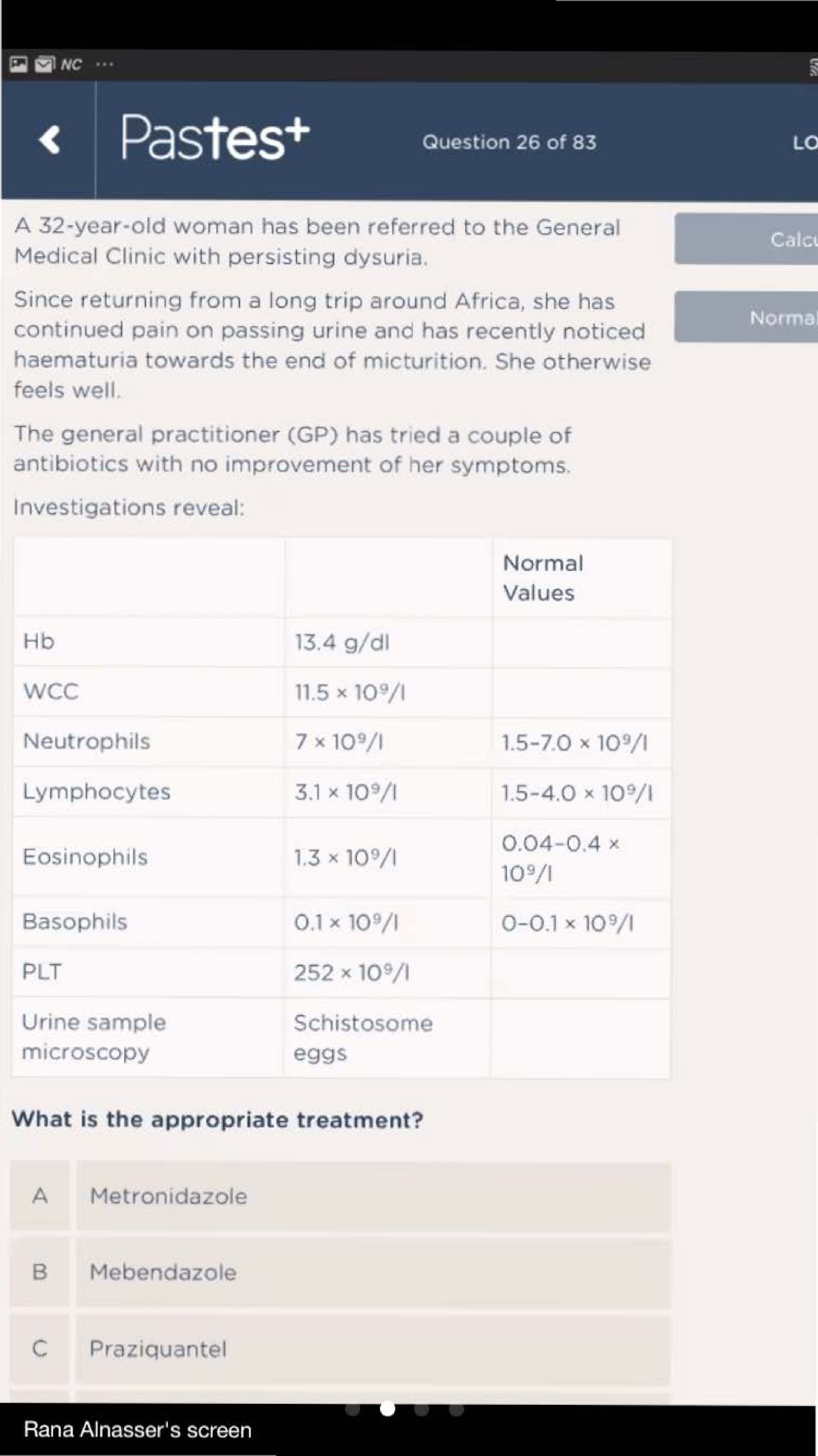
Domperidone is a peripherally selective D2 receptor antagonist; it is therefore much more rarely associated with acute dystonic reactions.

D Sumatriptan

Sumatriptan is used as an intervention for migraine, and is a 5HT agonist.

E Ondansetron

Ondansetron is a 5HT antagonist used for the treatment of nausea in this patient group without risk of causing acute dystonia.



A 32-year-old woman has been referred to the General Medical Clinic with persisting dysuria.

Since returning from a long trip around Africa, she has continued pain on passing urine and has recently noticed haematuria towards the end of micturition. She otherwise feels well.

The general practitioner (GP) has tried a couple of antibiotics with no improvement of her symptoms.

Investigations reveal:

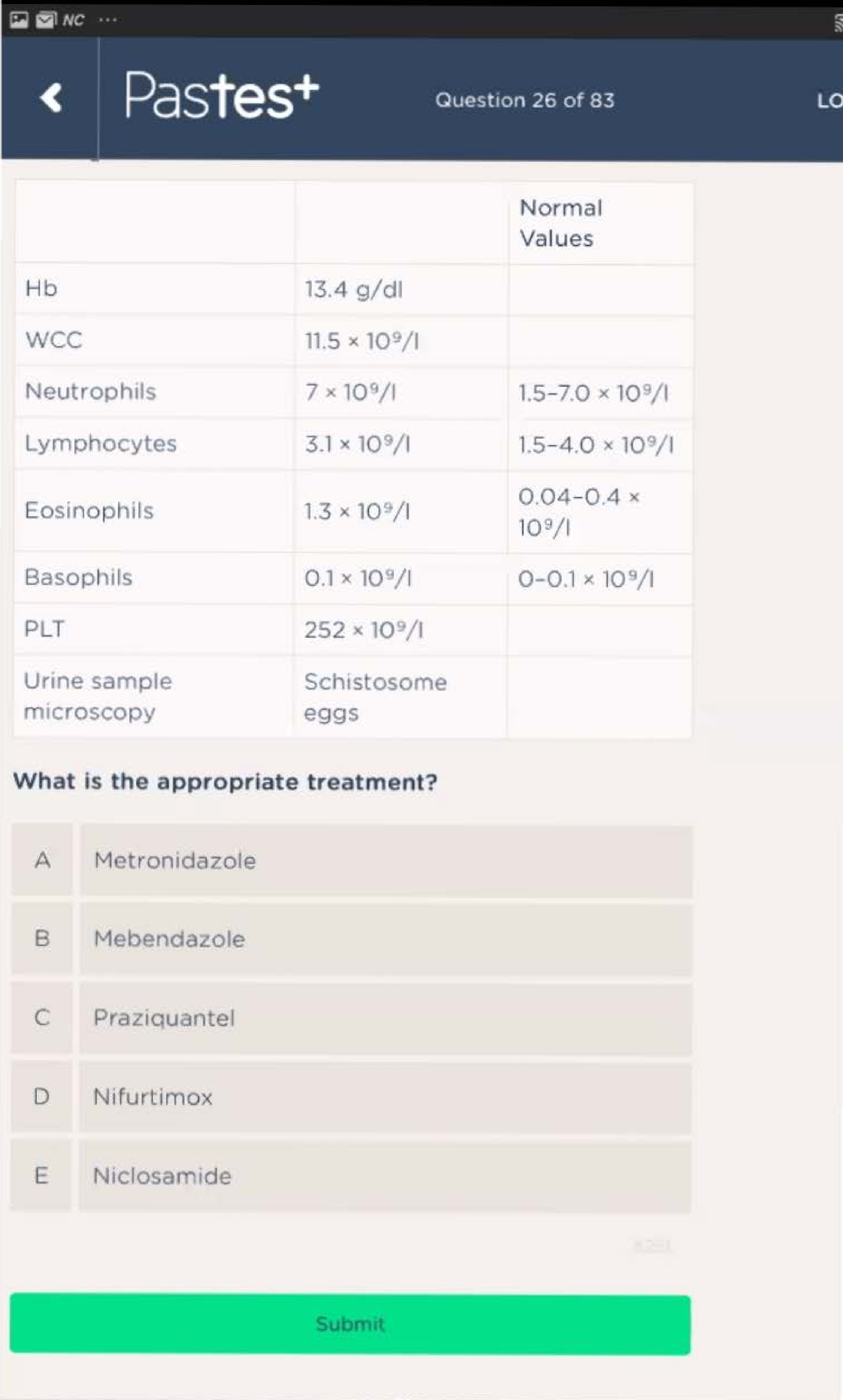
		Normal Values
Hb	13.4 g/dl	
WCC	11.5 × 10^9/l	
Neutrophils	7 × 10^9/l	1.5–7.0 × 10^9/l
Lymphocytes	3.1 × 10^9/l	1.5–4.0 × 10^9/l
Eosinophils	1.3 × 10^9/l	0.04–0.4 × 10^9/l
Basophils	0.1 × 10^9/l	0–0.1 × 10^9/l
PLT	252 × 10^9/l	
Urine sample microscopy	Schistosome eggs	

What is the appropriate treatment?

A Metronidazole

B Mebendazole

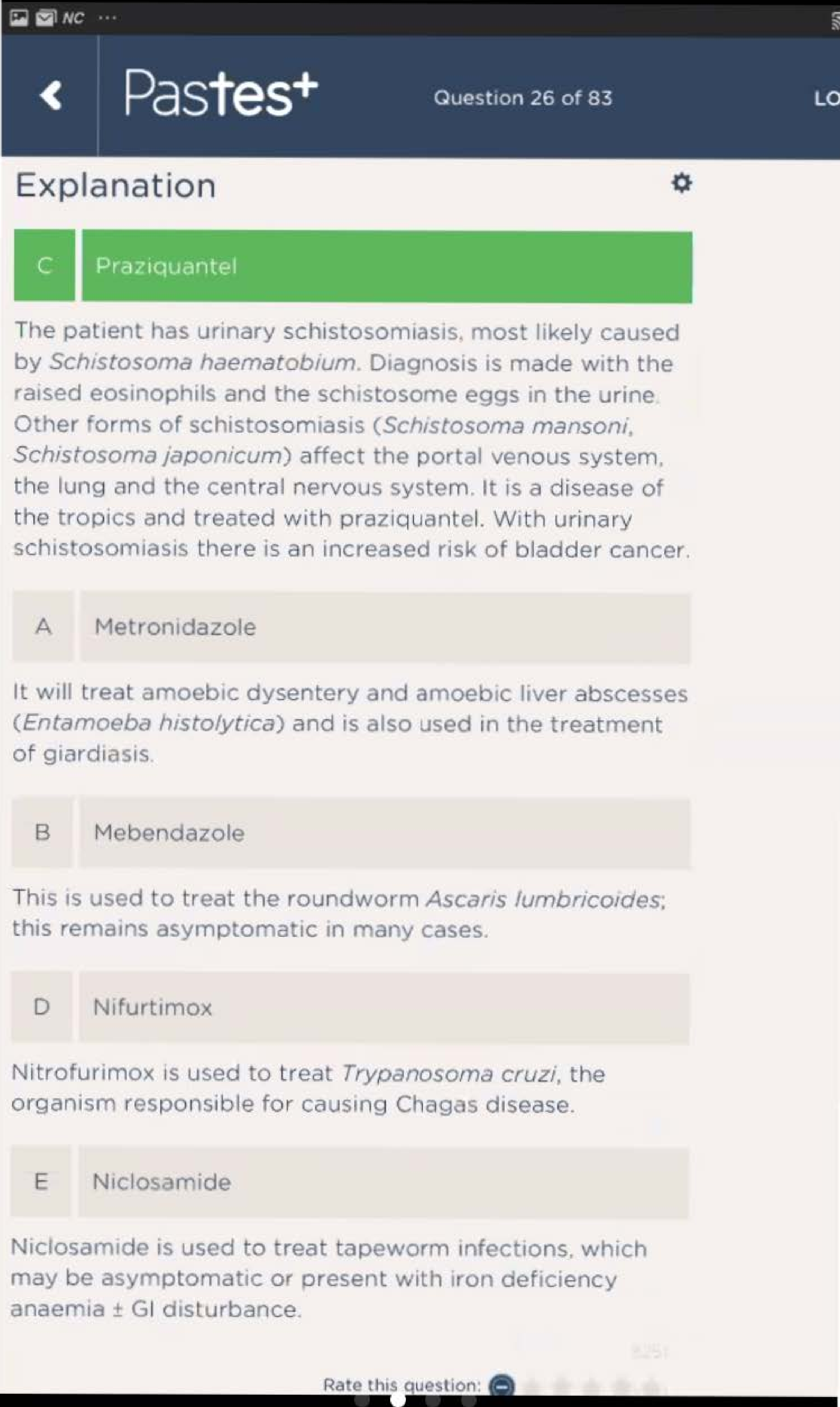
C Praziquantel



		Normal Values
Hb	13.4 g/dl	
WCC	11.5×10^9/l	
Neutrophils	7×10^9/l	$1.5–7.0 \times 10^9$/l
Lymphocytes	3.1×10^9/l	$1.5–4.0 \times 10^9$/l
Eosinophils	1.3×10^9/l	$0.04–0.4 \times 10^9$/l
Basophils	0.1×10^9/l	$0–0.1 \times 10^9$/l
PLT	252×10^9/l	
Urine sample microscopy	Schistosome eggs	

What is the appropriate treatment?

A	Metronidazole
B	Mebendazole
C	Praziquantel
D	Nifurtimox
E	Niclosamide



Explanation

C Praziquantel

The patient has urinary schistosomiasis, most likely caused by *Schistosoma haematobium*. Diagnosis is made with the raised eosinophils and the schistosome eggs in the urine. Other forms of schistosomiasis (*Schistosoma mansoni*, *Schistosoma japonicum*) affect the portal venous system, the lung and the central nervous system. It is a disease of the tropics and treated with praziquantel. With urinary schistosomiasis there is an increased risk of bladder cancer.

A Metronidazole

It will treat amoebic dysentery and amoebic liver abscesses (*Entamoeba histolytica*) and is also used in the treatment of giardiasis.

B Mebendazole

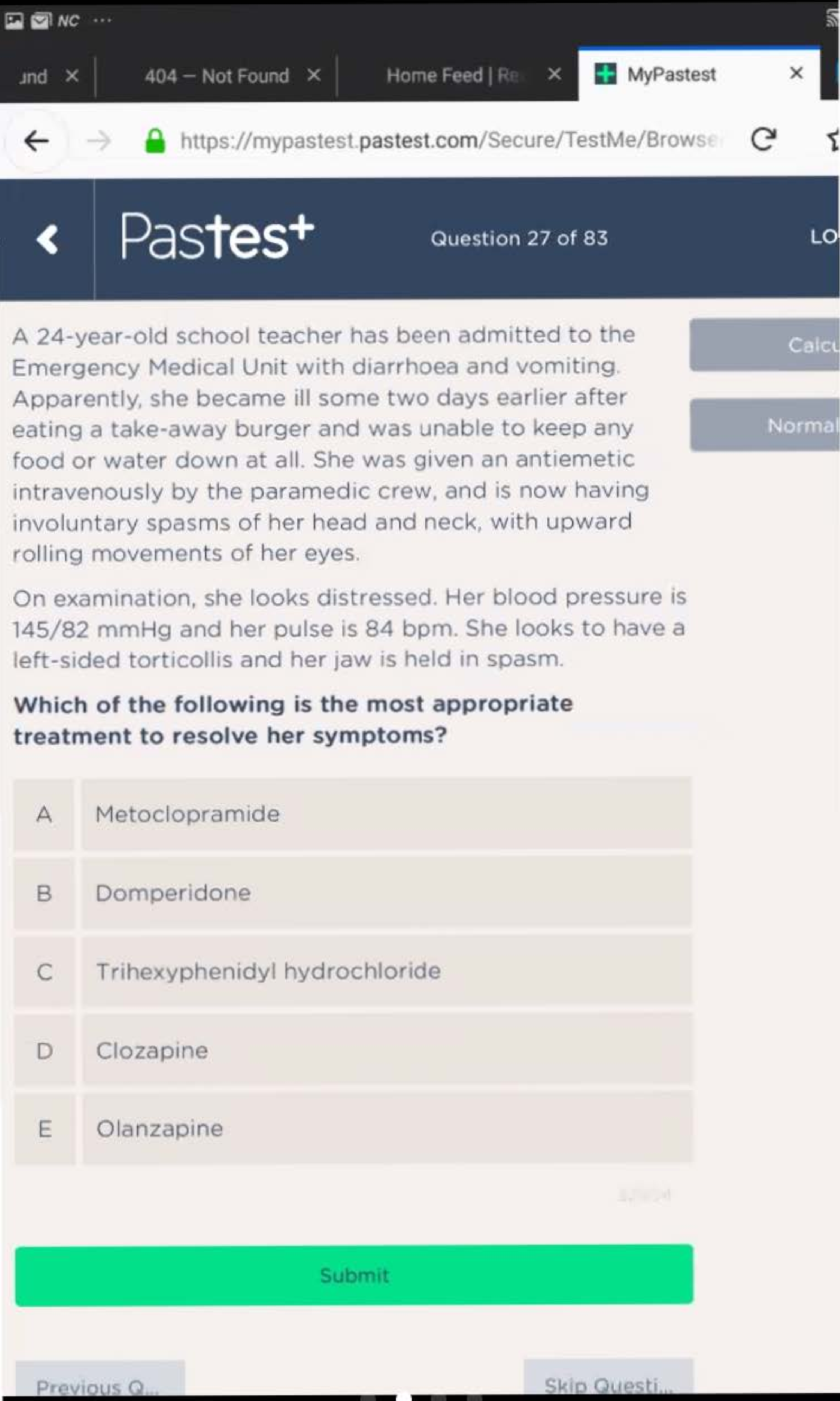
This is used to treat the roundworm *Ascaris lumbricoides*; this remains asymptomatic in many cases.

D Nifurtimox

Nitrofurimox is used to treat *Trypanosoma cruzi*, the organism responsible for causing Chagas disease.

E Niclosamide

Niclosamide is used to treat tapeworm infections, which may be asymptomatic or present with iron deficiency anaemia ± GI disturbance.

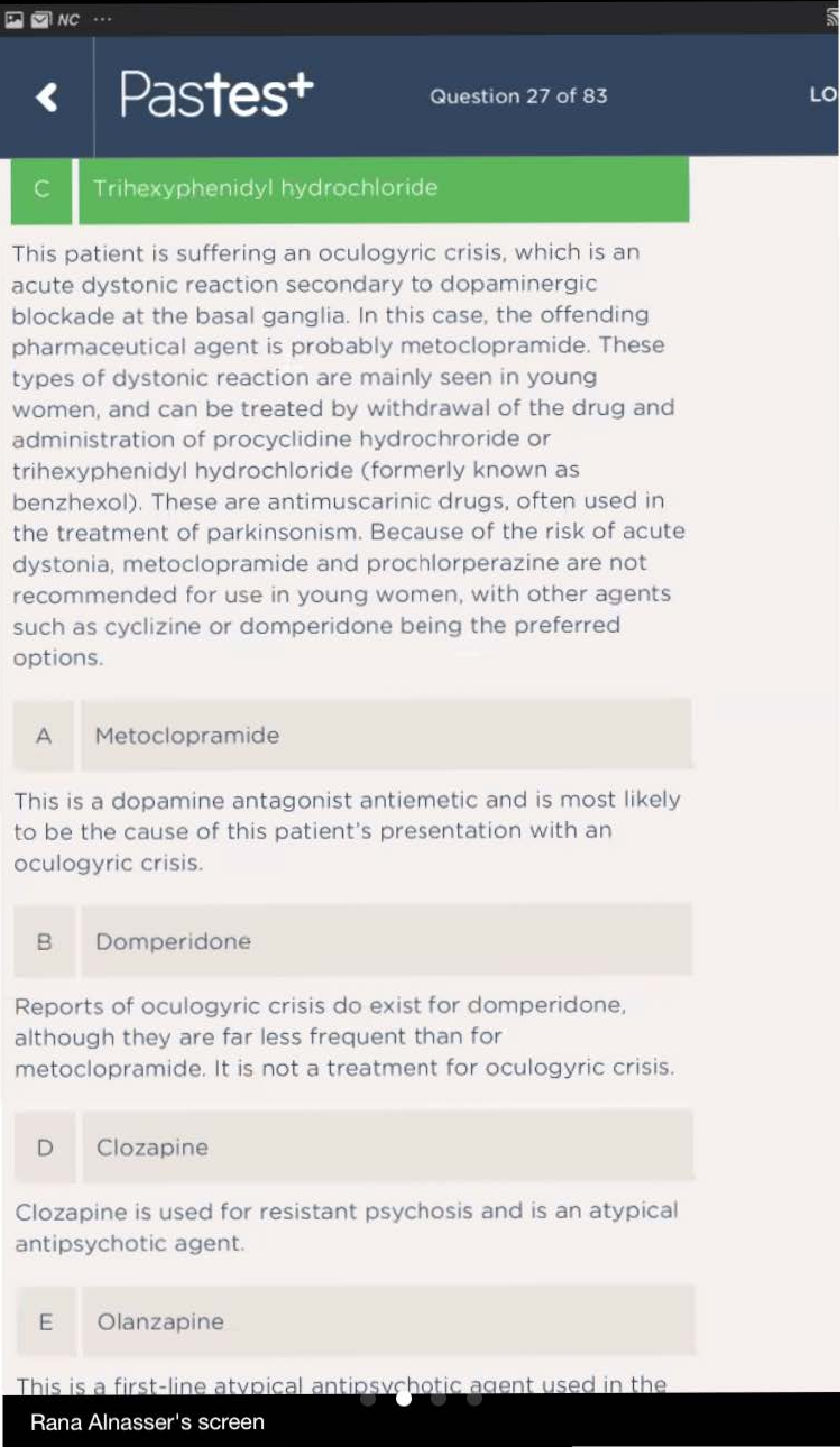


A 24-year-old school teacher has been admitted to the Emergency Medical Unit with diarrhoea and vomiting. Apparently, she became ill some two days earlier after eating a take-away burger and was unable to keep any food or water down at all. She was given an antiemetic intravenously by the paramedic crew, and is now having involuntary spasms of her head and neck, with upward rolling movements of her eyes.

On examination, she looks distressed. Her blood pressure is 145/82 mmHg and her pulse is 84 bpm. She looks to have a left-sided torticollis and her jaw is held in spasm.

Which of the following is the most appropriate treatment to resolve her symptoms?

A	Metoclopramide
B	Domperidone
C	Trihexyphenidyl hydrochloride
D	Clozapine
E	Olanzapine



C Trihexyphenidyl hydrochloride

This patient is suffering an oculogyric crisis, which is an acute dystonic reaction secondary to dopaminergic blockade at the basal ganglia. In this case, the offending pharmaceutical agent is probably metoclopramide. These types of dystonic reaction are mainly seen in young women, and can be treated by withdrawal of the drug and administration of procyclidine hydrochroride or trihexyphenidyl hydrochloride (formerly known as benzhexol). These are antimuscarinic drugs, often used in the treatment of parkinsonism. Because of the risk of acute dystonia, metoclopramide and prochlorperazine are not recommended for use in young women, with other agents such as cyclizine or domperidone being the preferred options.

A Metoclopramide

This is a dopamine antagonist antiemetic and is most likely to be the cause of this patient's presentation with an oculogyric crisis.

B Domperidone

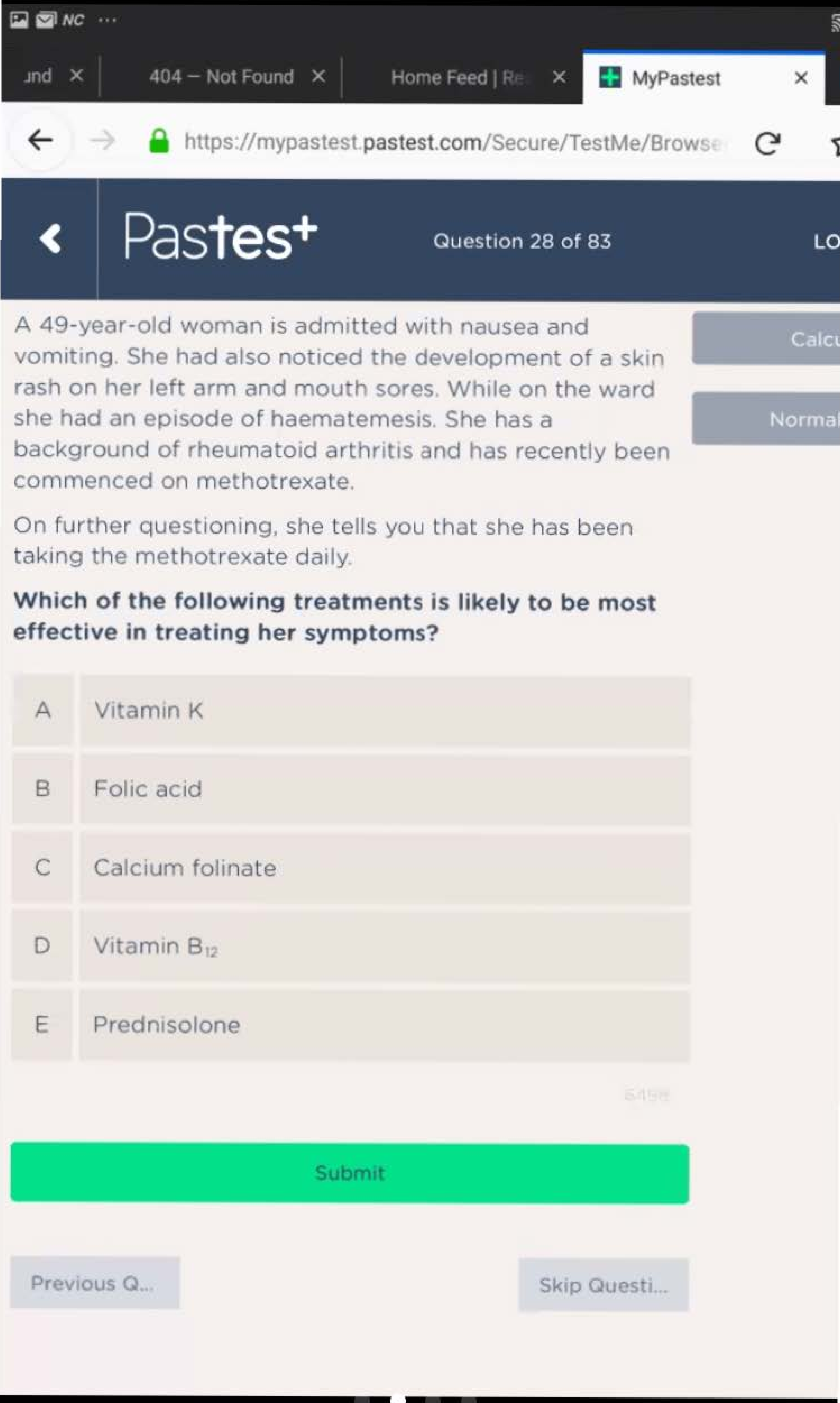
Reports of oculogyric crisis do exist for domperidone, although they are far less frequent than for metoclopramide. It is not a treatment for oculogyric crisis.

D Clozapine

Clozapine is used for resistant psychosis and is an atypical antipsychotic agent.

E Olanzapine

This is a first-line atypical antipsychotic agent used in the



A 49-year-old woman is admitted with nausea and vomiting. She had also noticed the development of a skin rash on her left arm and mouth sores. While on the ward she had an episode of haematemesis. She has a background of rheumatoid arthritis and has recently been commenced on methotrexate.

On further questioning, she tells you that she has been taking the methotrexate daily.

Which of the following treatments is likely to be most effective in treating her symptoms?

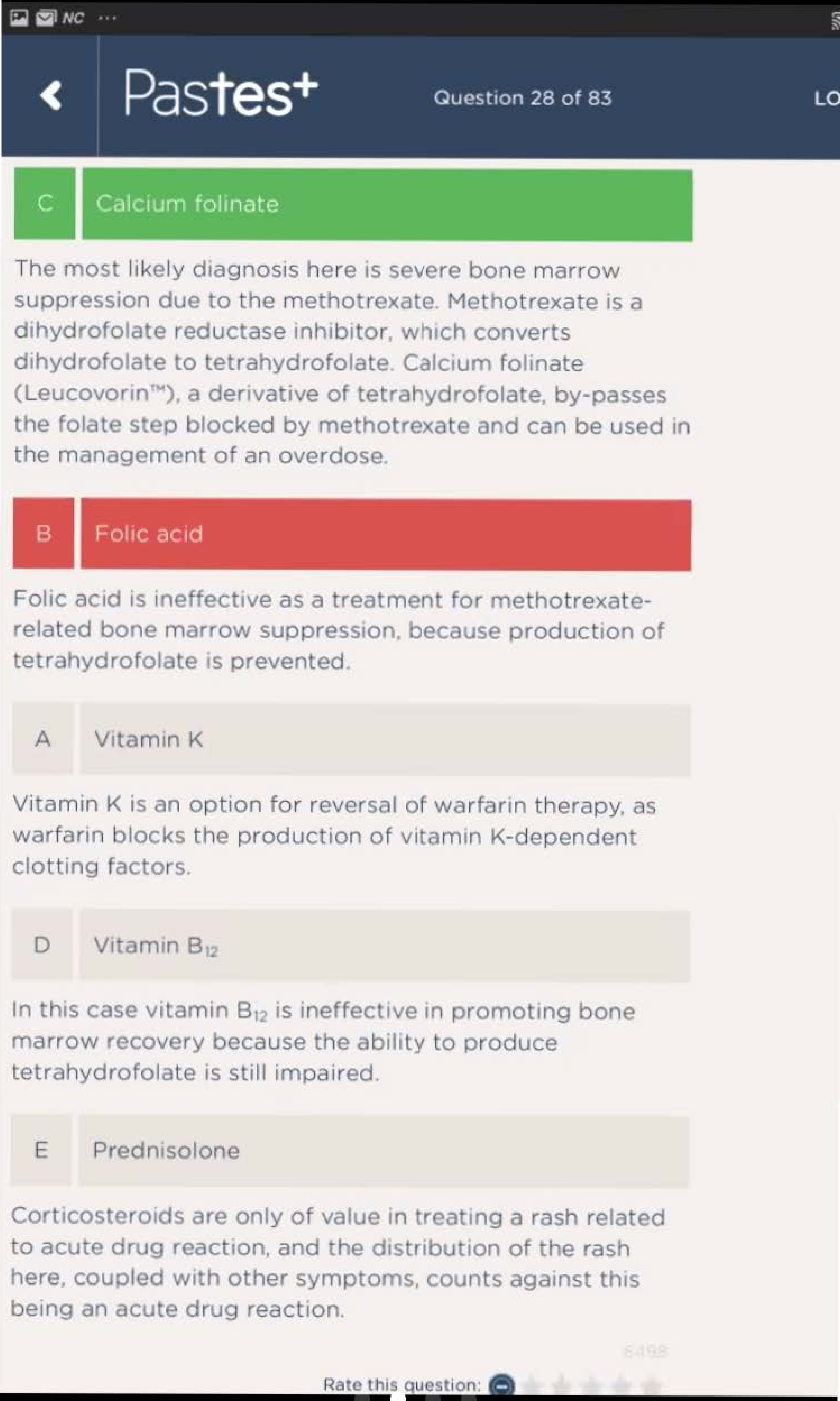
A Vitamin K

B Folic acid

C Calcium folinate

D Vitamin B_{12}

E Prednisolone



C Calcium folinate

The most likely diagnosis here is severe bone marrow suppression due to the methotrexate. Methotrexate is a dihydrofolate reductase inhibitor, which converts dihydrofolate to tetrahydrofolate. Calcium folinate (Leucovorin™), a derivative of tetrahydrofolate, by-passes the folate step blocked by methotrexate and can be used in the management of an overdose.

B Folic acid

Folic acid is ineffective as a treatment for methotrexate-related bone marrow suppression, because production of tetrahydrofolate is prevented.

A Vitamin K

Vitamin K is an option for reversal of warfarin therapy, as warfarin blocks the production of vitamin K-dependent clotting factors.

D Vitamin B_{12}

In this case vitamin B_{12} is ineffective in promoting bone marrow recovery because the ability to produce tetrahydrofolate is still impaired.

E Prednisolone

Corticosteroids are only of value in treating a rash related to acute drug reaction, and the distribution of the rash here, coupled with other symptoms, counts against this being an acute drug reaction.

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Question 29 of 83

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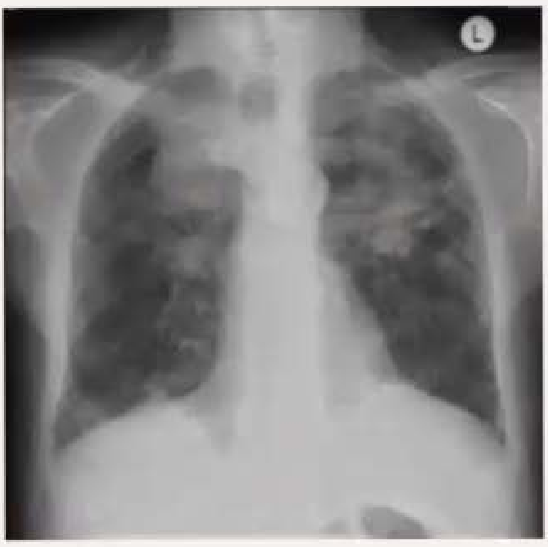
Normal

A 32-year-old patient is admitted to hospital with increasing shortness of breath, cough, wheeze and chest tightness. He has a background of testicular cancer and mild asthma.

A chest X-ray is shown below.



What is the most likely cause of his respiratory symptoms?

A Bleomycin

B Busulfan

C Methotrexate

D Cyclophosphamide

E Daunorubicin

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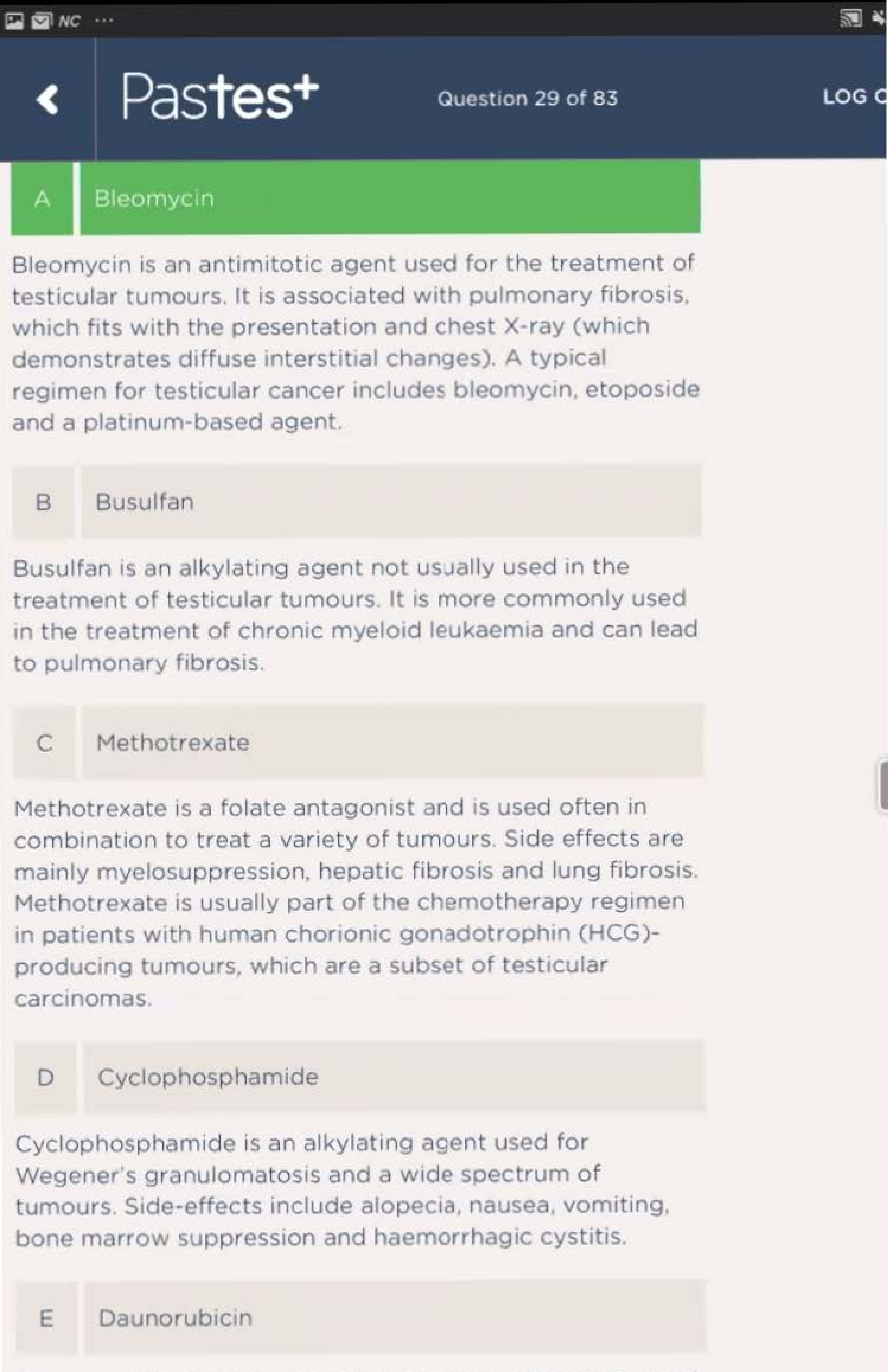
Rana Alnasser's screen



A Bleomycin

Bleomycin is an antimitotic agent used for the treatment of testicular tumours. It is associated with pulmonary fibrosis, which fits with the presentation and chest X-ray (which demonstrates diffuse interstitial changes). A typical regimen for testicular cancer includes bleomycin, etoposide and a platinum-based agent.

B Busulfan

Busulfan is an alkylating agent not usually used in the treatment of testicular tumours. It is more commonly used in the treatment of chronic myeloid leukaemia and can lead to pulmonary fibrosis.

C Methotrexate

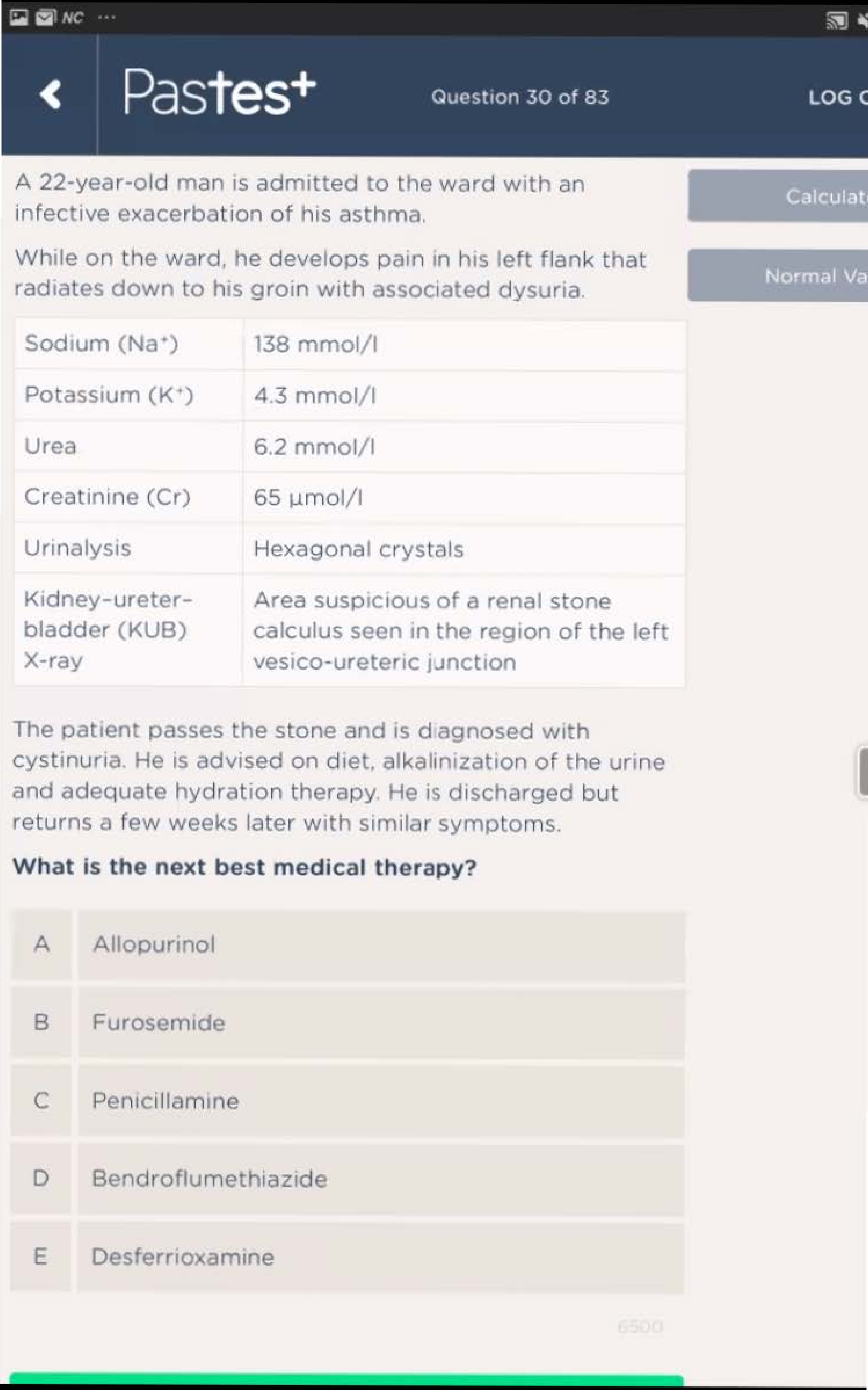
Methotrexate is a folate antagonist and is used often in combination to treat a variety of tumours. Side effects are mainly myelosuppression, hepatic fibrosis and lung fibrosis. Methotrexate is usually part of the chemotherapy regimen in patients with human chorionic gonadotrophin (HCG)-producing tumours, which are a subset of testicular carcinomas.

D Cyclophosphamide

Cyclophosphamide is an alkylating agent used for Wegener's granulomatosis and a wide spectrum of tumours. Side-effects include alopecia, nausea, vomiting, bone marrow suppression and haemorrhagic cystitis.

E Daunorubicin

Daunorubicin, like doxorubicin, is an antimitotic agent used



A 22-year-old man is admitted to the ward with an infective exacerbation of his asthma.

While on the ward, he develops pain in his left flank that radiates down to his groin with associated dysuria.

Sodium (Na^+)	138 mmol/l
Potassium (K^+)	4.3 mmol/l
Urea	6.2 mmol/l
Creatinine (Cr)	65 µmol/l
Urinalysis	Hexagonal crystals
Kidney-ureter-bladder (KUB) X-ray	Area suspicious of a renal stone calculus seen in the region of the left vesico-ureteric junction

The patient passes the stone and is diagnosed with cystinuria. He is advised on diet, alkalinization of the urine and adequate hydration therapy. He is discharged but returns a few weeks later with similar symptoms.

What is the next best medical therapy?

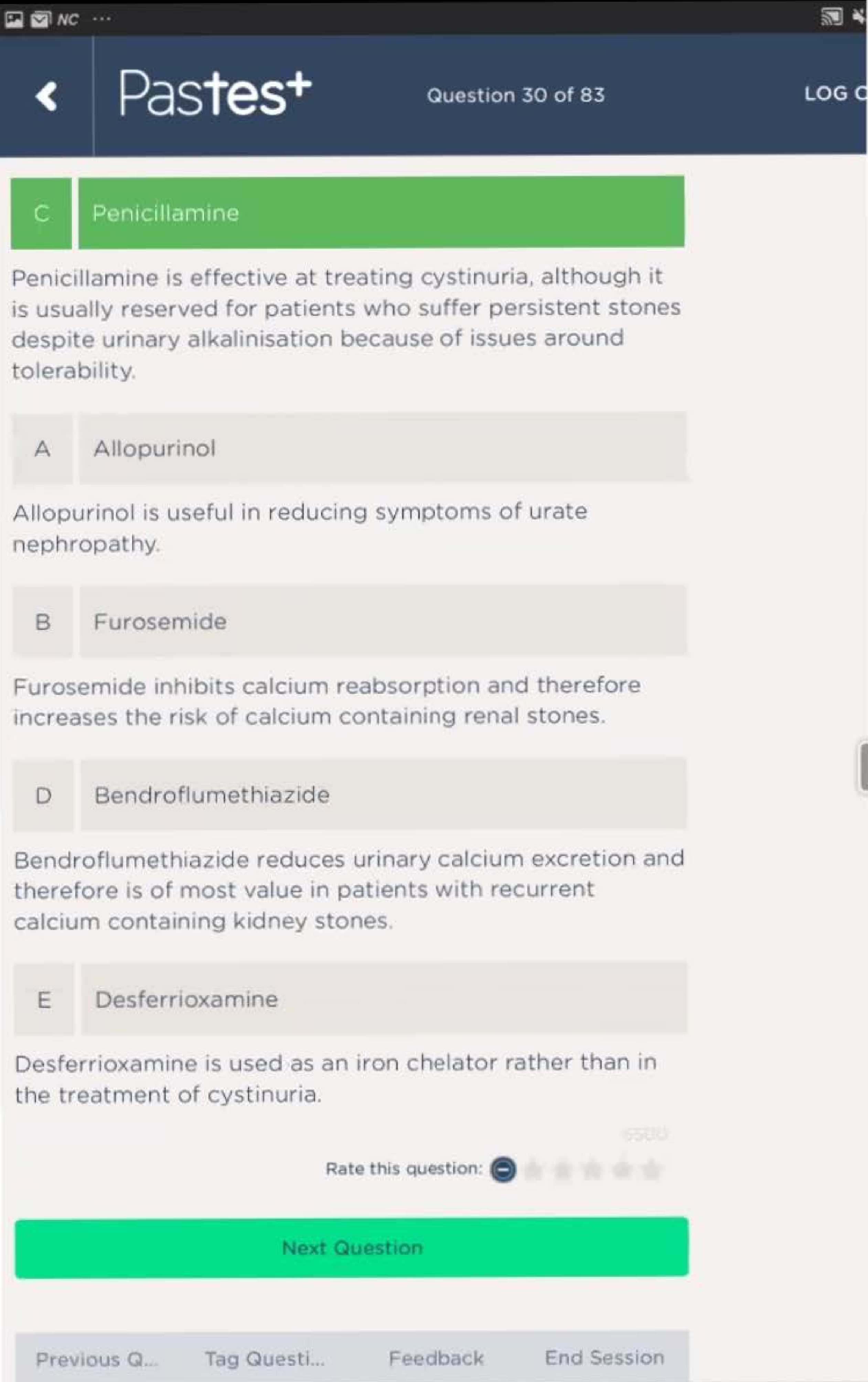
A Allopurinol

B Furosemide

C Penicillamine

D Bendroflumethiazide

E Desferrioxamine



C Penicillamine

Penicillamine is effective at treating cystinuria, although it is usually reserved for patients who suffer persistent stones despite urinary alkalinisation because of issues around tolerability.

A Allopurinol

Allopurinol is useful in reducing symptoms of urate nephropathy.

B Furosemide

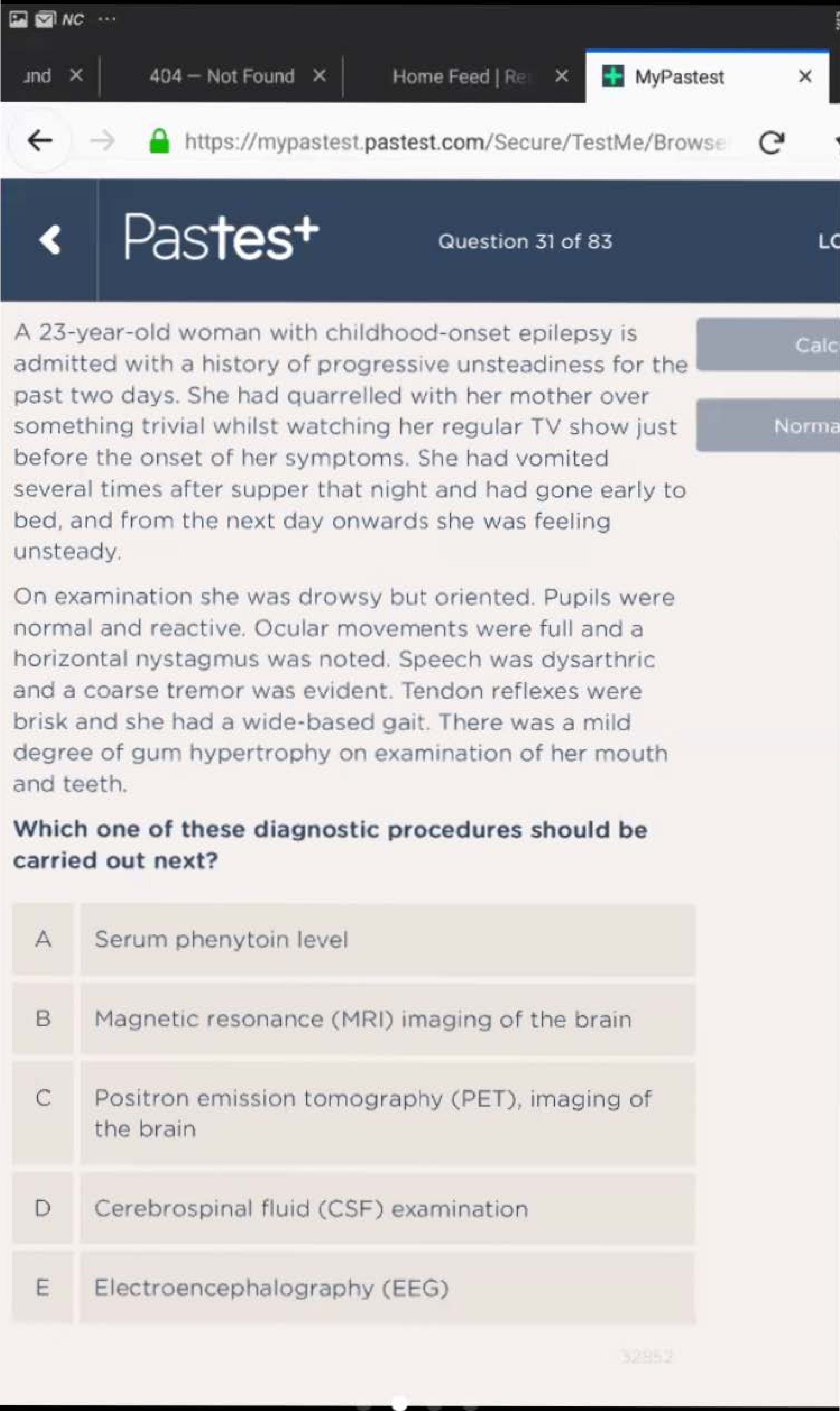
Furosemide inhibits calcium reabsorption and therefore increases the risk of calcium containing renal stones.

D Bendroflumethiazide

Bendroflumethiazide reduces urinary calcium excretion and therefore is of most value in patients with recurrent calcium containing kidney stones.

E Desferrioxamine

Desferrioxamine is used as an iron chelator rather than in the treatment of cystinuria.



A 23-year-old woman with childhood-onset epilepsy is admitted with a history of progressive unsteadiness for the past two days. She had quarrelled with her mother over something trivial whilst watching her regular TV show just before the onset of her symptoms. She had vomited several times after supper that night and had gone early to bed, and from the next day onwards she was feeling unsteady.

On examination she was drowsy but oriented. Pupils were normal and reactive. Ocular movements were full and a horizontal nystagmus was noted. Speech was dysarthric and a coarse tremor was evident. Tendon reflexes were brisk and she had a wide-based gait. There was a mild degree of gum hypertrophy on examination of her mouth and teeth.

Which one of these diagnostic procedures should be carried out next?

A	Serum phenytoin level
B	Magnetic resonance (MRI) imaging of the brain
C	Positron emission tomography (PET), imaging of the brain
D	Cerebrospinal fluid (CSF) examination
E	Electroencephalography (EEG)

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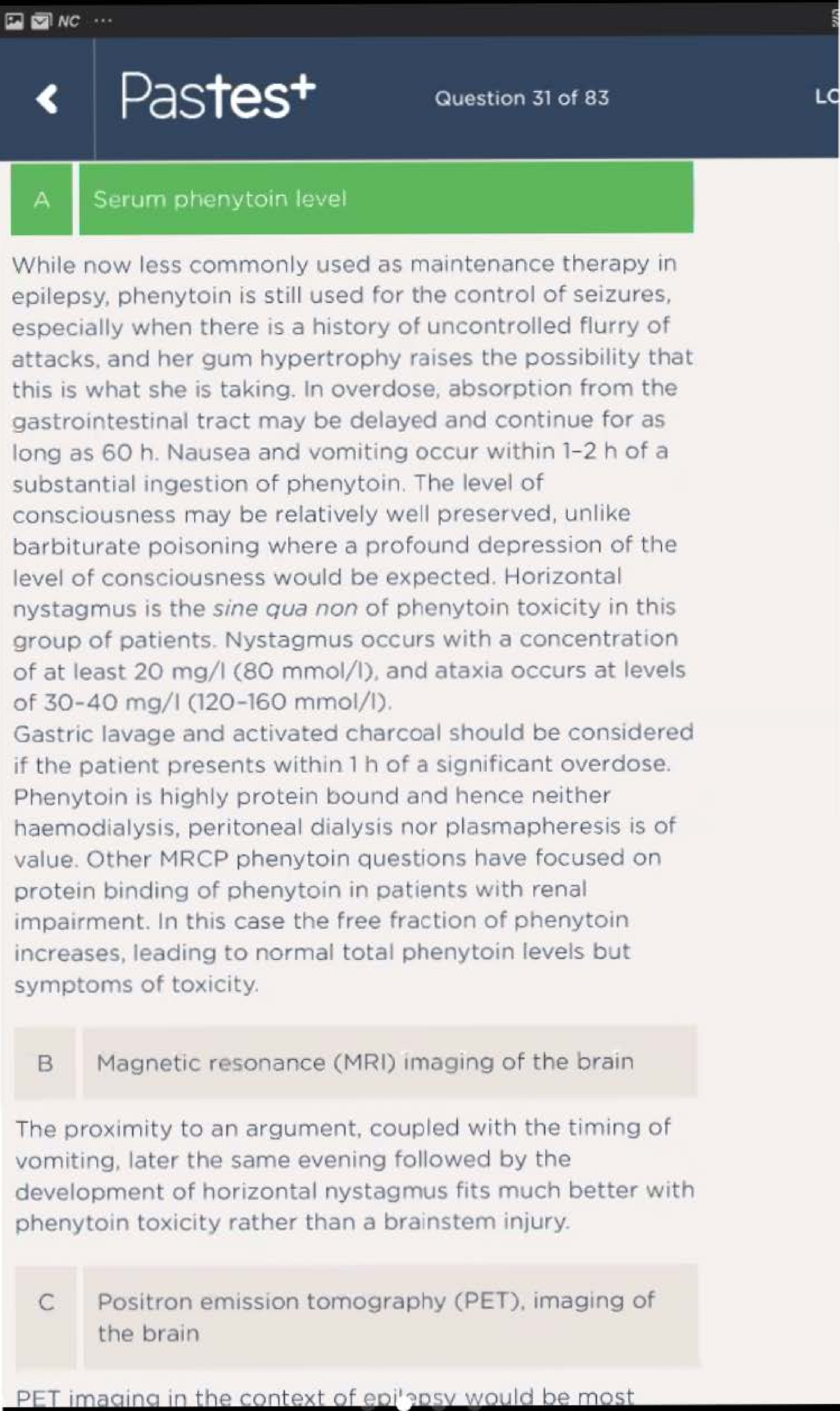


A Serum phenytoin level

While now less commonly used as maintenance therapy in epilepsy, phenytoin is still used for the control of seizures, especially when there is a history of uncontrolled flurry of attacks, and her gum hypertrophy raises the possibility that this is what she is taking. In overdose, absorption from the gastrointestinal tract may be delayed and continue for as long as 60 h. Nausea and vomiting occur within 1–2 h of a substantial ingestion of phenytoin. The level of consciousness may be relatively well preserved, unlike barbiturate poisoning where a profound depression of the level of consciousness would be expected. Horizontal nystagmus is the *sine qua non* of phenytoin toxicity in this group of patients. Nystagmus occurs with a concentration of at least 20 mg/l (80 mmol/l), and ataxia occurs at levels of 30–40 mg/l (120–160 mmol/l).

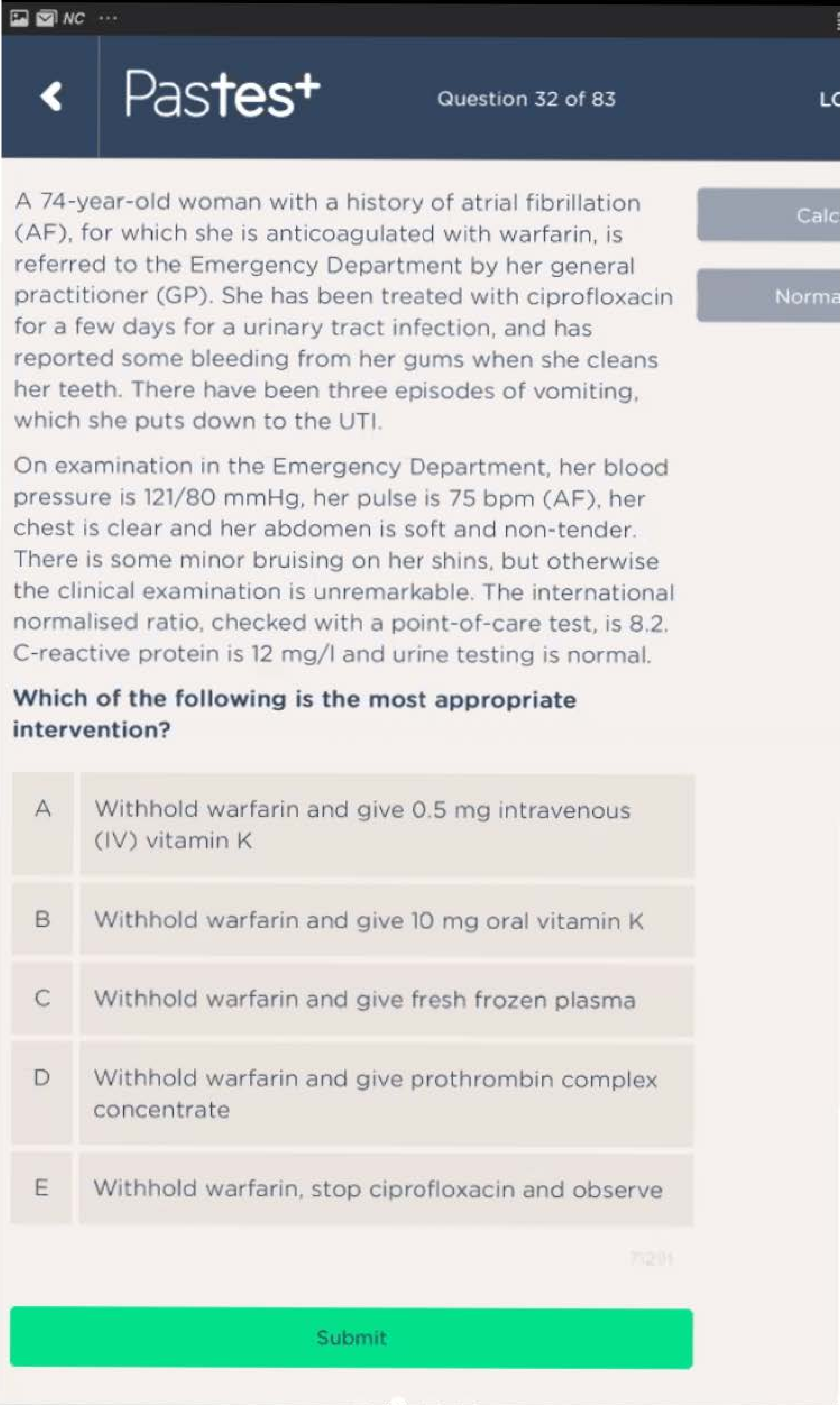
Gastric lavage and activated charcoal should be considered if the patient presents within 1 h of a significant overdose. Phenytoin is highly protein bound and hence neither haemodialysis, peritoneal dialysis nor plasmapheresis is of value. Other MRCP phenytoin questions have focused on protein binding of phenytoin in patients with renal impairment. In this case the free fraction of phenytoin increases, leading to normal total phenytoin levels but symptoms of toxicity.

B Magnetic resonance (MRI) imaging of the brain

The proximity to an argument, coupled with the timing of vomiting, later the same evening followed by the development of horizontal nystagmus fits much better with phenytoin toxicity rather than a brainstem injury.

C Positron emission tomography (PET), imaging of the brain

PET imaging in the context of epilepsy would be most



A 74-year-old woman with a history of atrial fibrillation (AF), for which she is anticoagulated with warfarin, is referred to the Emergency Department by her general practitioner (GP). She has been treated with ciprofloxacin for a few days for a urinary tract infection, and has reported some bleeding from her gums when she cleans her teeth. There have been three episodes of vomiting, which she puts down to the UTI.

On examination in the Emergency Department, her blood pressure is 121/80 mmHg, her pulse is 75 bpm (AF), her chest is clear and her abdomen is soft and non-tender. There is some minor bruising on her shins, but otherwise the clinical examination is unremarkable. The international normalised ratio, checked with a point-of-care test, is 8.2. C-reactive protein is 12 mg/l and urine testing is normal.

Which of the following is the most appropriate intervention?

A Withhold warfarin and give 0.5 mg intravenous (IV) vitamin K

B Withhold warfarin and give 10 mg oral vitamin K

C Withhold warfarin and give fresh frozen plasma

D Withhold warfarin and give prothrombin complex concentrate

E Withhold warfarin, stop ciprofloxacin and observe

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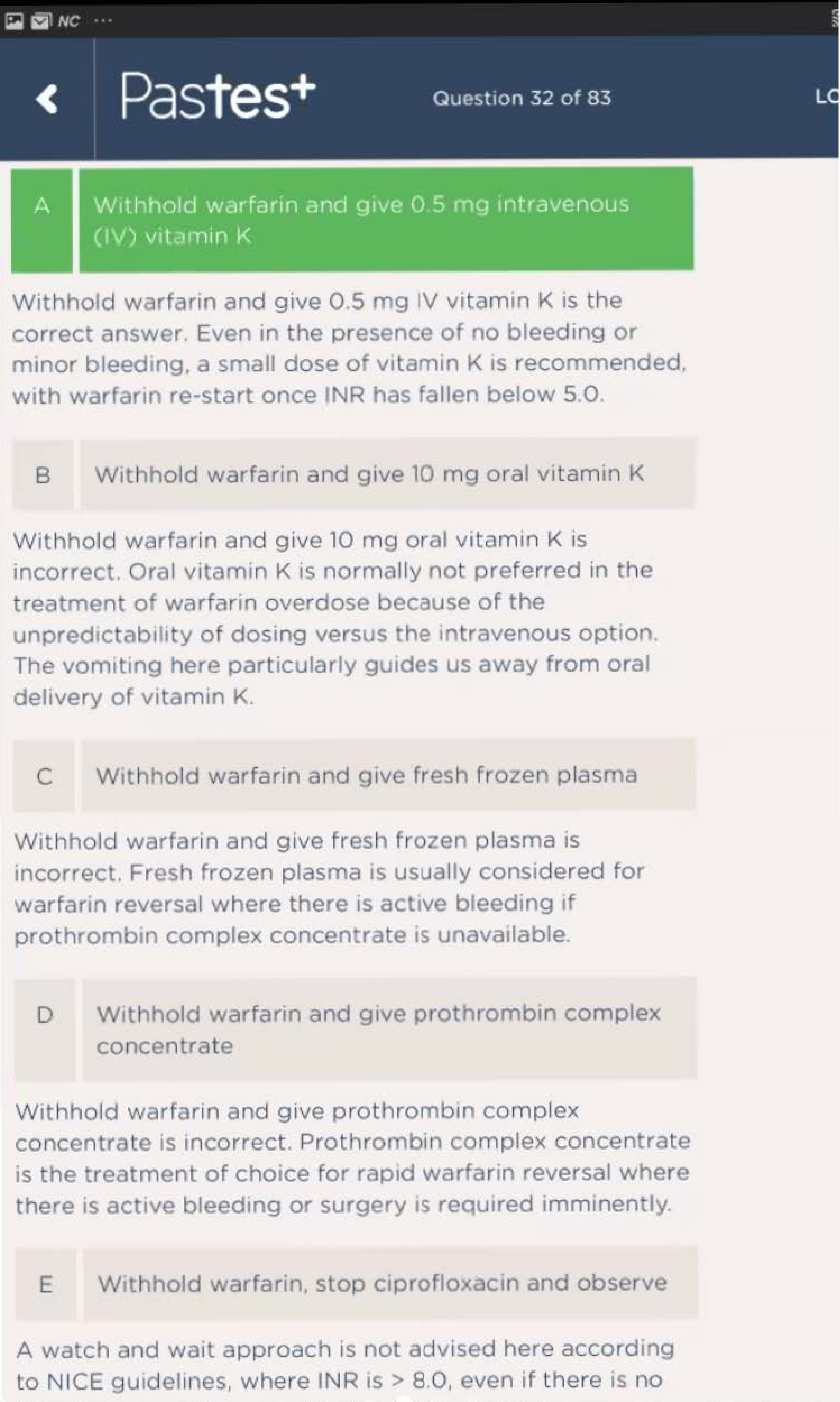
Rana Alnasser's screen



A — Withhold warfarin and give 0.5 mg intravenous (IV) vitamin K

Withhold warfarin and give 0.5 mg IV vitamin K is the correct answer. Even in the presence of no bleeding or minor bleeding, a small dose of vitamin K is recommended, with warfarin re-start once INR has fallen below 5.0.

B — Withhold warfarin and give 10 mg oral vitamin K

Withhold warfarin and give 10 mg oral vitamin K is incorrect. Oral vitamin K is normally not preferred in the treatment of warfarin overdose because of the unpredictability of dosing versus the intravenous option. The vomiting here particularly guides us away from oral delivery of vitamin K.

C — Withhold warfarin and give fresh frozen plasma

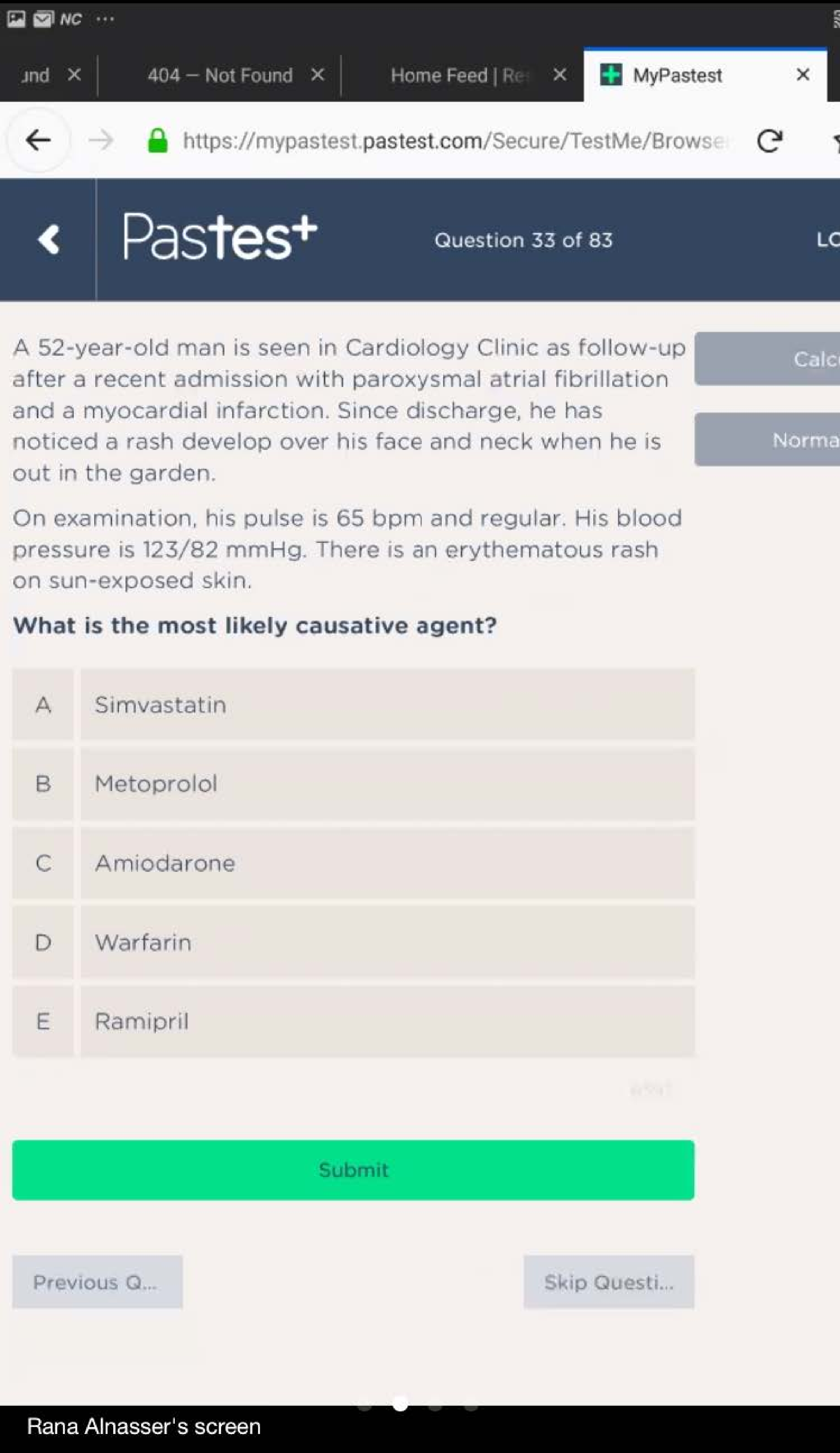
Withhold warfarin and give fresh frozen plasma is incorrect. Fresh frozen plasma is usually considered for warfarin reversal where there is active bleeding if prothrombin complex concentrate is unavailable.

D — Withhold warfarin and give prothrombin complex concentrate

Withhold warfarin and give prothrombin complex concentrate is incorrect. Prothrombin complex concentrate is the treatment of choice for rapid warfarin reversal where there is active bleeding or surgery is required imminently.

E — Withhold warfarin, stop ciprofloxacin and observe

A watch and wait approach is not advised here according to NICE guidelines, where INR is > 8.0, even if there is no



A 52-year-old man is seen in Cardiology Clinic as follow-up after a recent admission with paroxysmal atrial fibrillation and a myocardial infarction. Since discharge, he has noticed a rash develop over his face and neck when he is out in the garden.

On examination, his pulse is 65 bpm and regular. His blood pressure is 123/82 mmHg. There is an erythematous rash on sun-exposed skin.

What is the most likely causative agent?

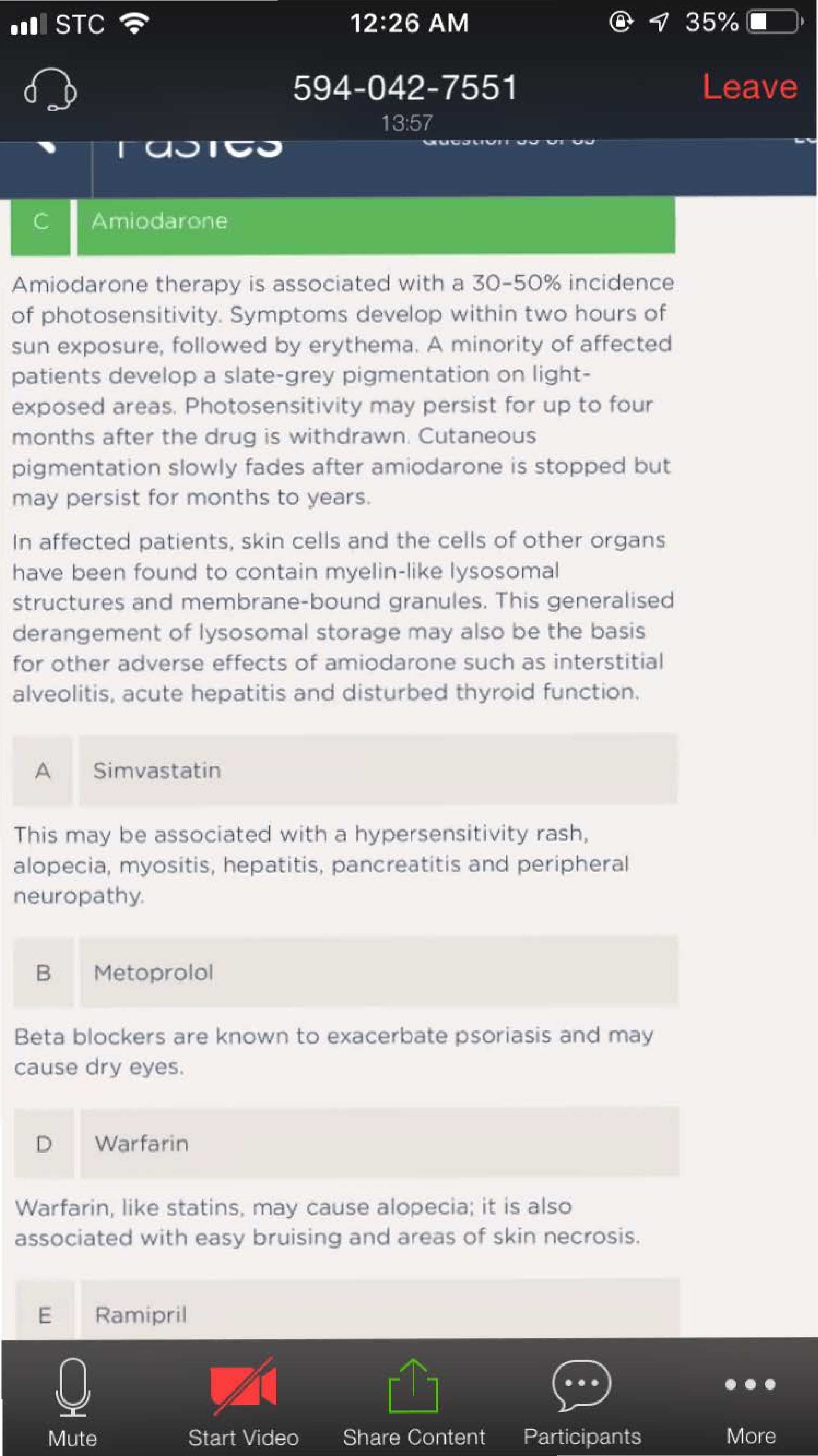
A Simvastatin

B Metoprolol

C Amiodarone

D Warfarin

E Ramipril



C Amiodarone

Amiodarone therapy is associated with a 30-50% incidence of photosensitivity. Symptoms develop within two hours of sun exposure, followed by erythema. A minority of affected patients develop a slate-grey pigmentation on light-exposed areas. Photosensitivity may persist for up to four months after the drug is withdrawn. Cutaneous pigmentation slowly fades after amiodarone is stopped but may persist for months to years.

In affected patients, skin cells and the cells of other organs have been found to contain myelin-like lysosomal structures and membrane-bound granules. This generalised derangement of lysosomal storage may also be the basis for other adverse effects of amiodarone such as interstitial alveolitis, acute hepatitis and disturbed thyroid function.

A Simvastatin

This may be associated with a hypersensitivity rash, alopecia, myositis, hepatitis, pancreatitis and peripheral neuropathy.

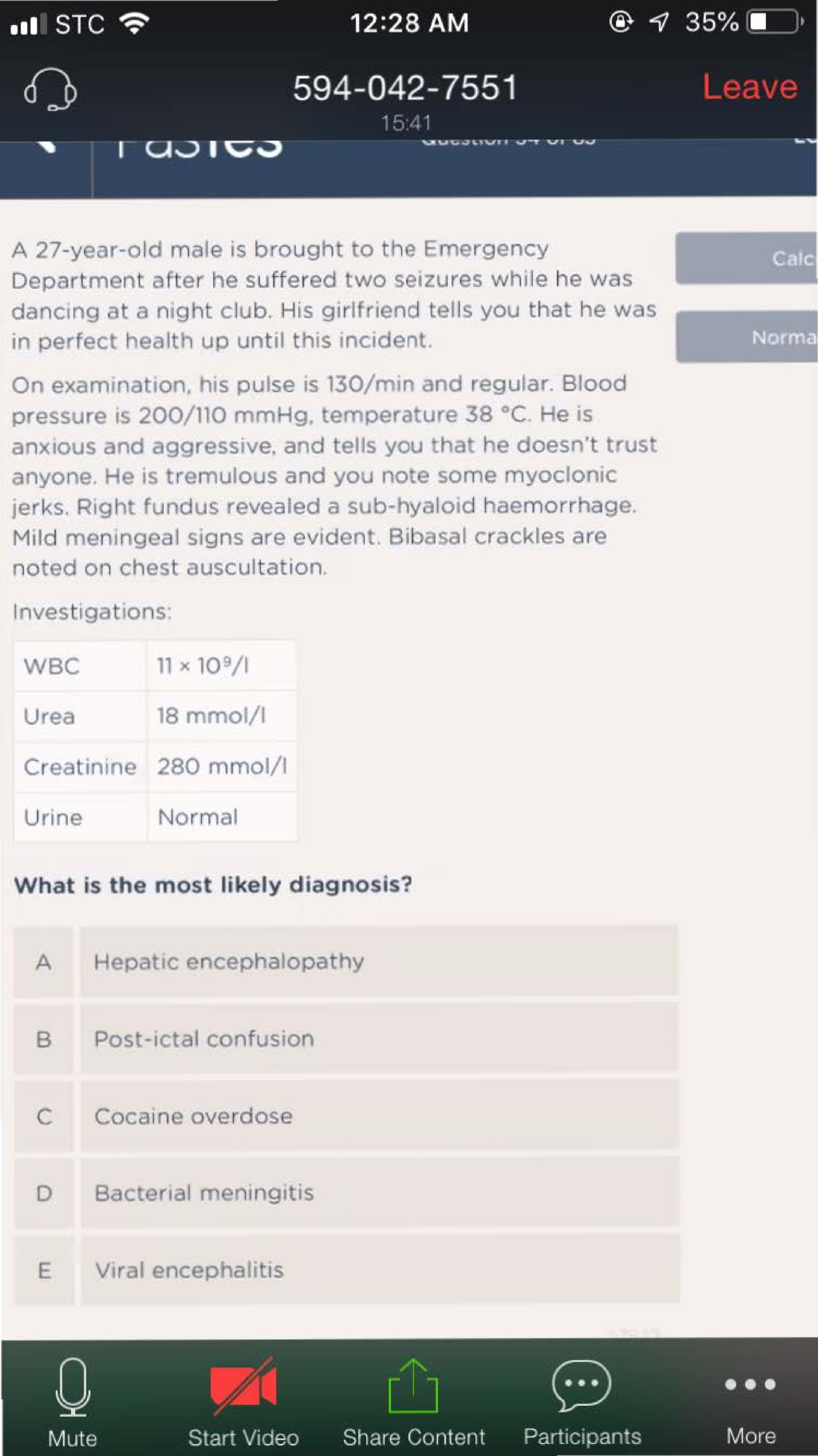
B Metoprolol

Beta blockers are known to exacerbate psoriasis and may cause dry eyes.

D Warfarin

Warfarin, like statins, may cause alopecia; it is also associated with easy bruising and areas of skin necrosis.

E Ramipril



A 27-year-old male is brought to the Emergency Department after he suffered two seizures while he was dancing at a night club. His girlfriend tells you that he was in perfect health up until this incident.

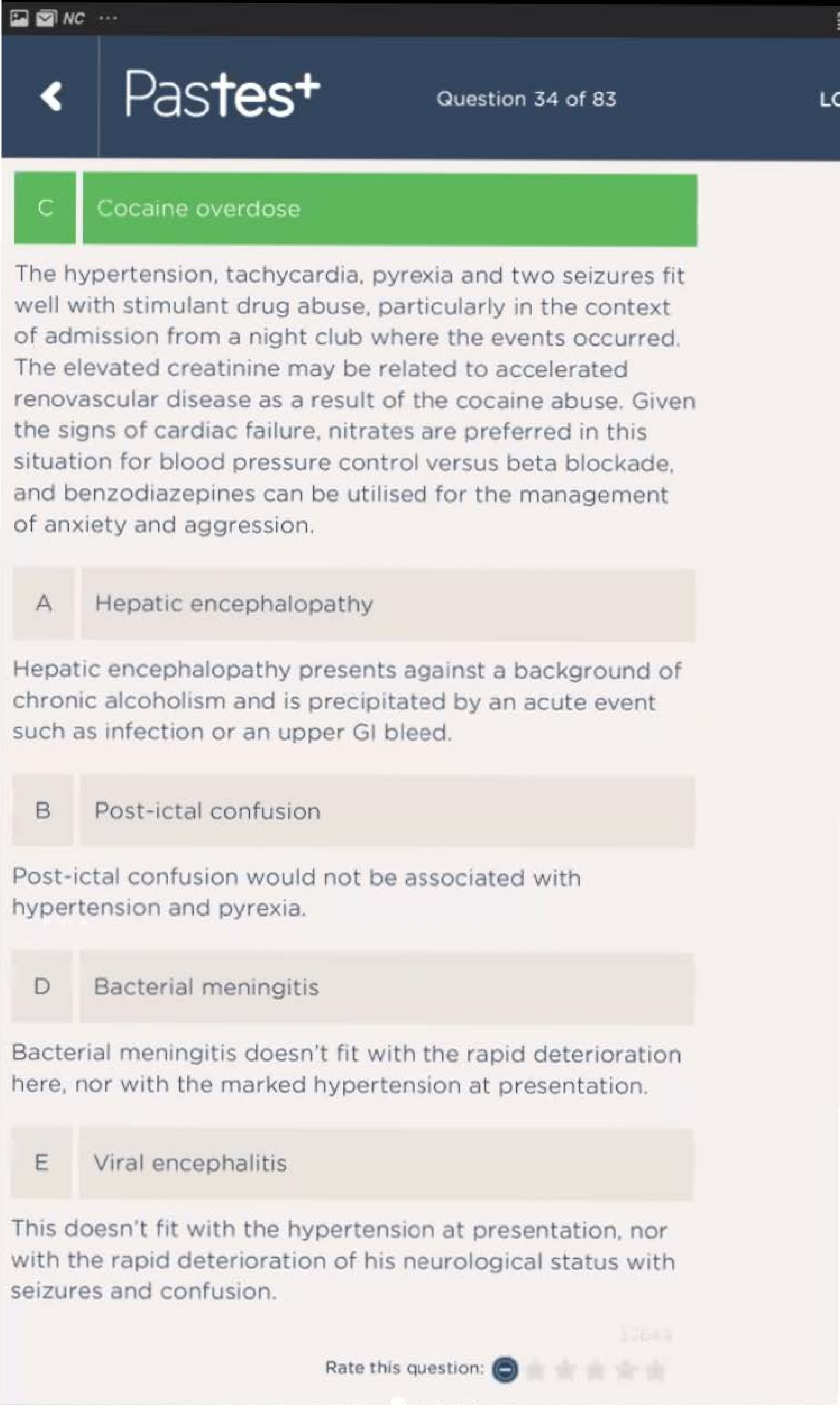
On examination, his pulse is 130/min and regular. Blood pressure is 200/110 mmHg, temperature 38 °C. He is anxious and aggressive, and tells you that he doesn't trust anyone. He is tremulous and you note some myoclonic jerks. Right fundus revealed a sub-hyaloid haemorrhage. Mild meningeal signs are evident. Bibasal crackles are noted on chest auscultation.

Investigations:

WBC	11×10^9/l
Urea	18 mmol/l
Creatinine	280 mmol/l
Urine	Normal

What is the most likely diagnosis?

A	Hepatic encephalopathy
B	Post-ictal confusion
C	Cocaine overdose
D	Bacterial meningitis
E	Viral encephalitis



C **Cocaine overdose**

The hypertension, tachycardia, pyrexia and two seizures fit well with stimulant drug abuse, particularly in the context of admission from a night club where the events occurred. The elevated creatinine may be related to accelerated renovascular disease as a result of the cocaine abuse. Given the signs of cardiac failure, nitrates are preferred in this situation for blood pressure control versus beta blockade, and benzodiazepines can be utilised for the management of anxiety and aggression.

A Hepatic encephalopathy

Hepatic encephalopathy presents against a background of chronic alcoholism and is precipitated by an acute event such as infection or an upper GI bleed.

B Post-ictal confusion

Post-ictal confusion would not be associated with hypertension and pyrexia.

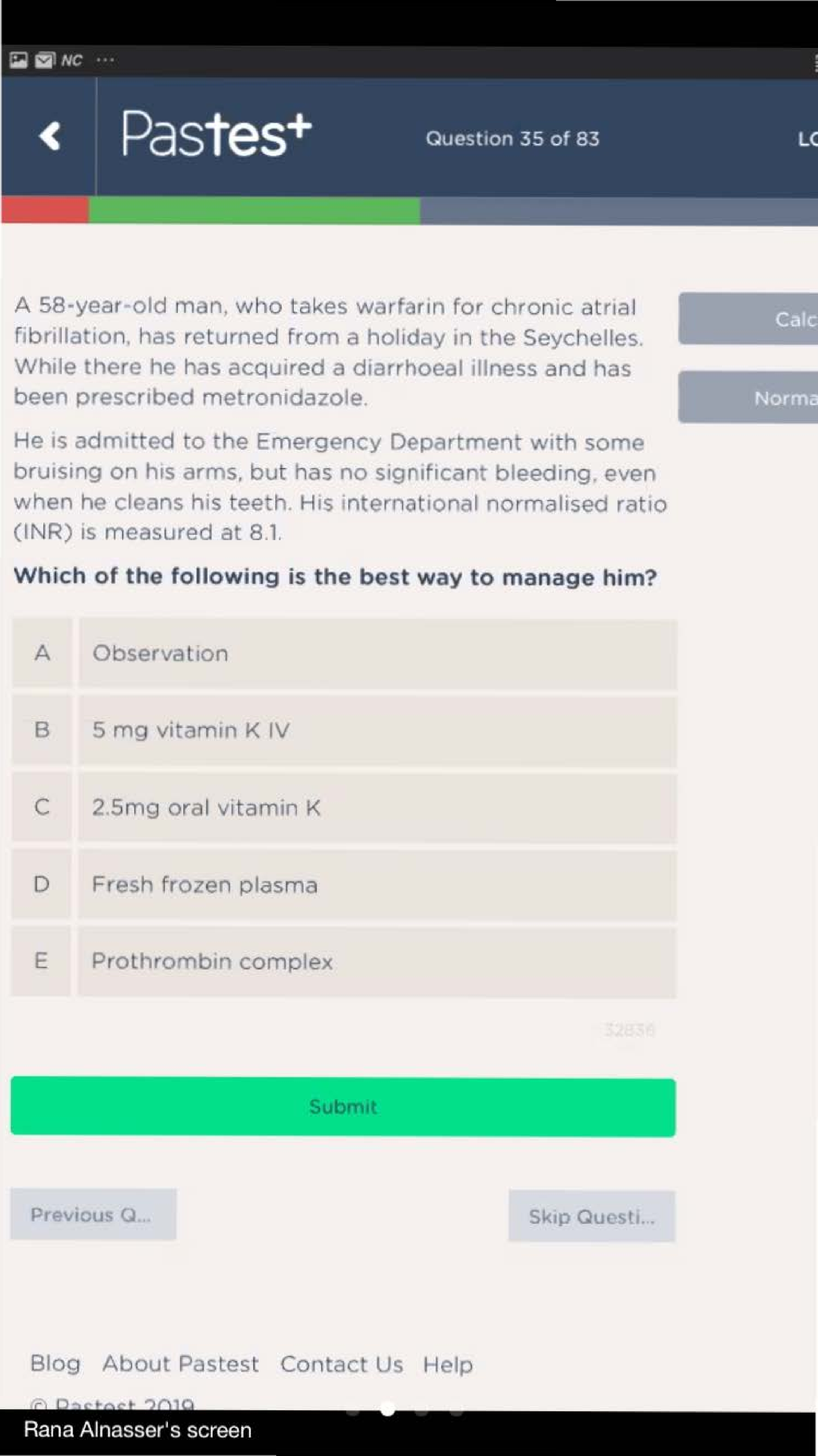
D Bacterial meningitis

Bacterial meningitis doesn't fit with the rapid deterioration here, nor with the marked hypertension at presentation.

E Viral encephalitis

This doesn't fit with the hypertension at presentation, nor with the rapid deterioration of his neurological status with seizures and confusion.

Rana Alnasser's screen



A 58-year-old man, who takes warfarin for chronic atrial fibrillation, has returned from a holiday in the Seychelles. While there he has acquired a diarrhoeal illness and has been prescribed metronidazole.

He is admitted to the Emergency Department with some bruising on his arms, but has no significant bleeding, even when he cleans his teeth. His international normalised ratio (INR) is measured at 8.1.

Which of the following is the best way to manage him?

A Observation
B 5 mg vitamin K IV
C 2.5mg oral vitamin K
D Fresh frozen plasma
E Prothrombin complex

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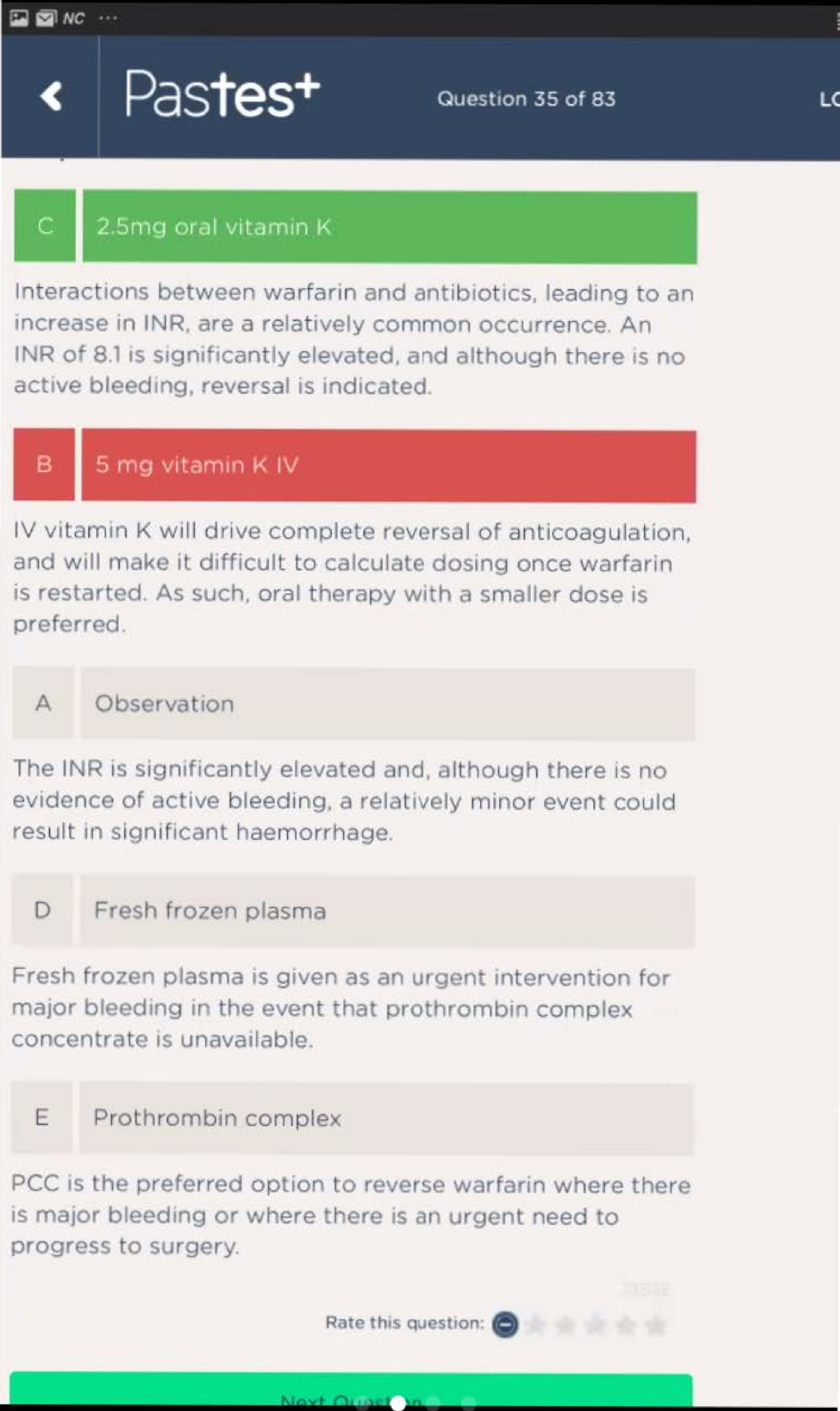


Question 35 of 83

C 2.5mg oral vitamin K

Interactions between warfarin and antibiotics, leading to an increase in INR, are a relatively common occurrence. An INR of 8.1 is significantly elevated, and although there is no active bleeding, reversal is indicated.

B 5 mg vitamin K IV

IV vitamin K will drive complete reversal of anticoagulation, and will make it difficult to calculate dosing once warfarin is restarted. As such, oral therapy with a smaller dose is preferred.

A Observation

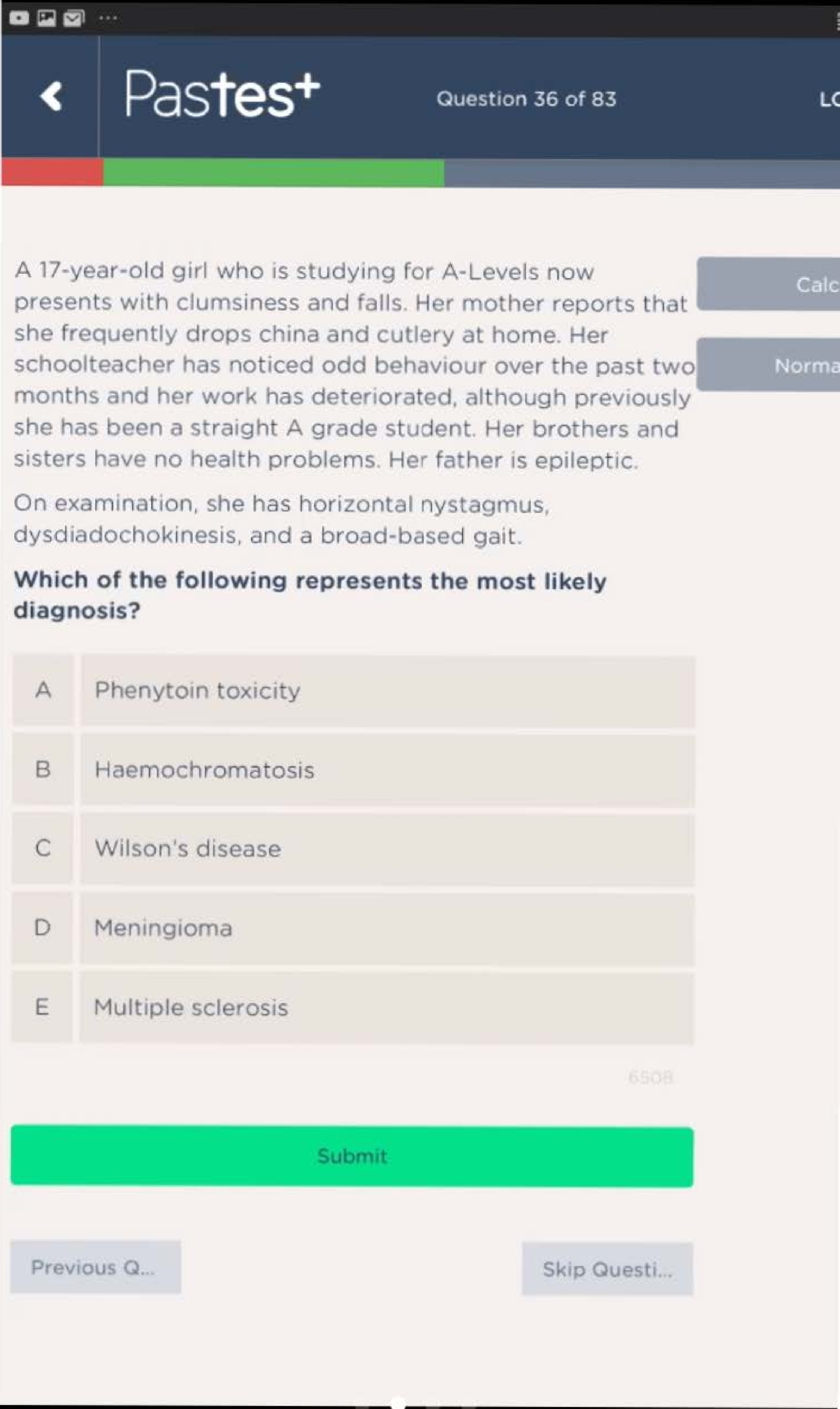
The INR is significantly elevated and, although there is no evidence of active bleeding, a relatively minor event could result in significant haemorrhage.

D Fresh frozen plasma

Fresh frozen plasma is given as an urgent intervention for major bleeding in the event that prothrombin complex concentrate is unavailable.

E Prothrombin complex

PCC is the preferred option to reverse warfarin where there is major bleeding or where there is an urgent need to progress to surgery.



A 17-year-old girl who is studying for A-Levels now presents with clumsiness and falls. Her mother reports that she frequently drops china and cutlery at home. Her schoolteacher has noticed odd behaviour over the past two months and her work has deteriorated, although previously she has been a straight A grade student. Her brothers and sisters have no health problems. Her father is epileptic.

On examination, she has horizontal nystagmus, dysdiadochokinesis, and a broad-based gait.

Which of the following represents the most likely diagnosis?

A Phenytoin toxicity
B Haemochromatosis
C Wilson's disease
D Meningioma
E Multiple sclerosis

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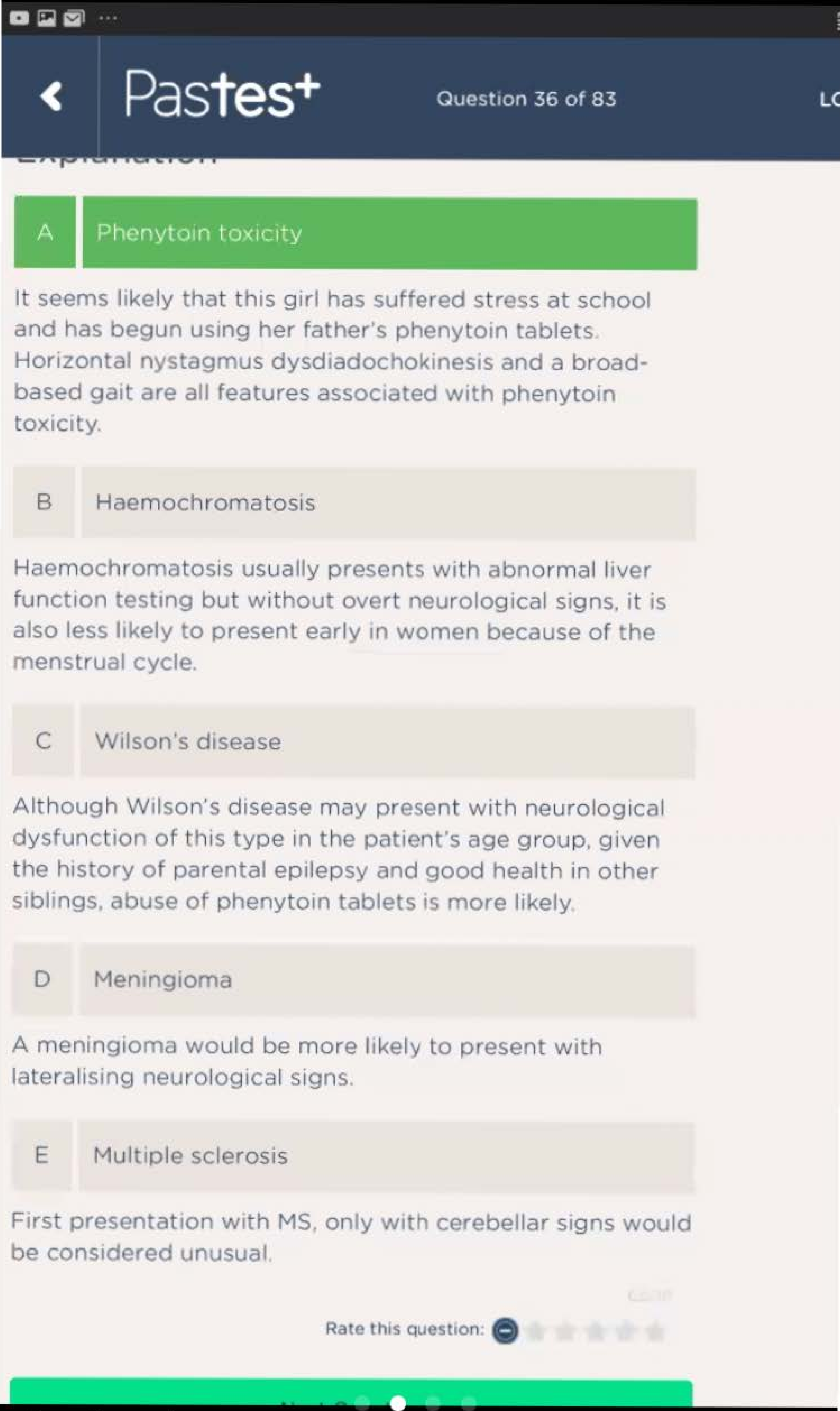


A Phenytoin toxicity

It seems likely that this girl has suffered stress at school and has begun using her father's phenytoin tablets. Horizontal nystagmus dysdiadochokinesis and a broad-based gait are all features associated with phenytoin toxicity.

B Haemochromatosis

Haemochromatosis usually presents with abnormal liver function testing but without overt neurological signs, it is also less likely to present early in women because of the menstrual cycle.

C Wilson's disease

Although Wilson's disease may present with neurological dysfunction of this type in the patient's age group, given the history of parental epilepsy and good health in other siblings, abuse of phenytoin tablets is more likely.

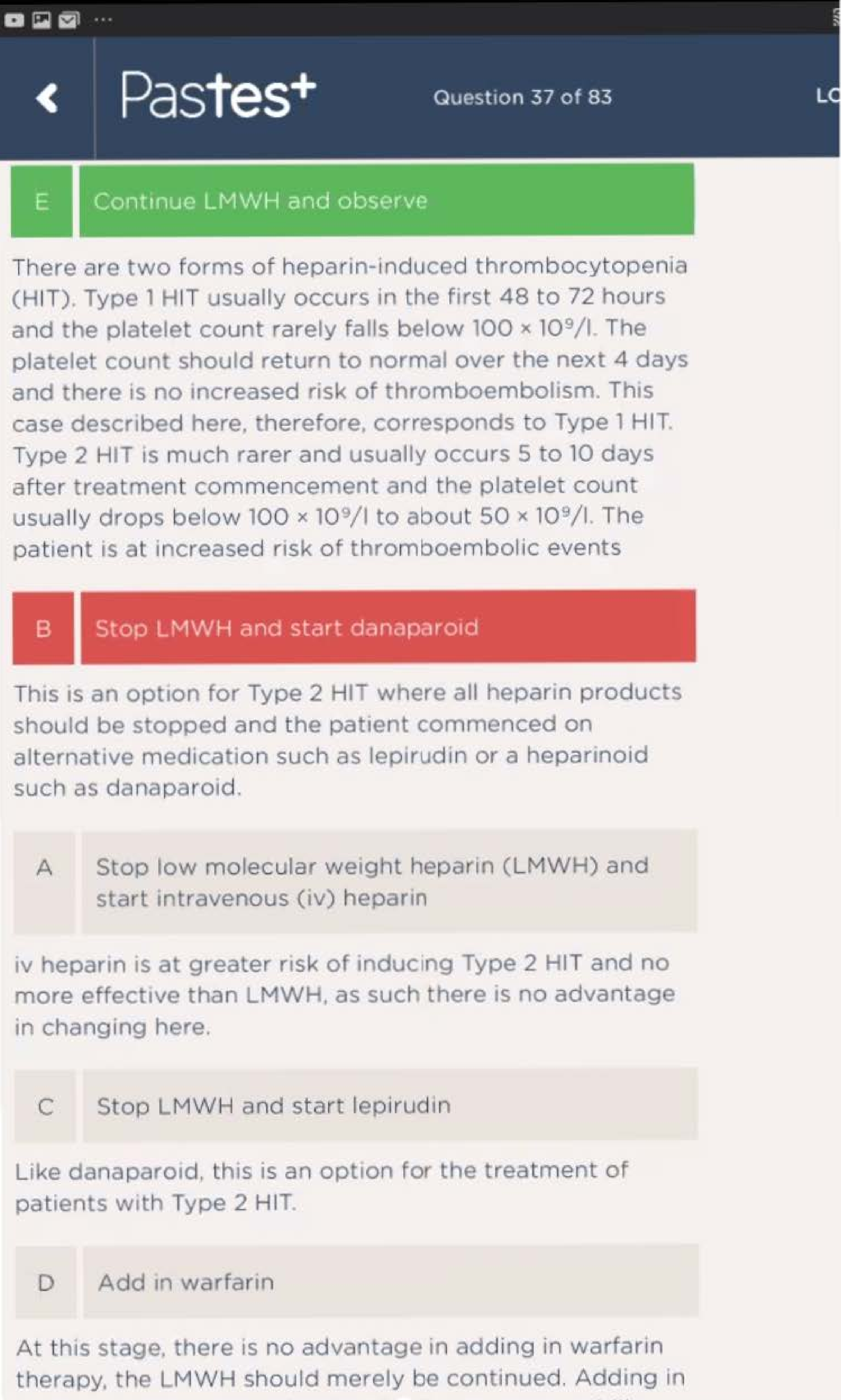
D Meningioma

A meningioma would be more likely to present with lateralising neurological signs.

E Multiple sclerosis

First presentation with MS, only with cerebellar signs would be considered unusual.

Rana Alnasser's screen



E Continue LMWH and observe

There are two forms of heparin-induced thrombocytopenia (HIT). Type 1 HIT usually occurs in the first 48 to 72 hours and the platelet count rarely falls below 100×10^9/l. The platelet count should return to normal over the next 4 days and there is no increased risk of thromboembolism. This case described here, therefore, corresponds to Type 1 HIT. Type 2 HIT is much rarer and usually occurs 5 to 10 days after treatment commencement and the platelet count usually drops below 100×10^9/l to about 50×10^9/l. The patient is at increased risk of thromboembolic events

B Stop LMWH and start danaparoid

This is an option for Type 2 HIT where all heparin products should be stopped and the patient commenced on alternative medication such as lepirudin or a heparinoid such as danaparoid.

A Stop low molecular weight heparin (LMWH) and start intravenous (iv) heparin

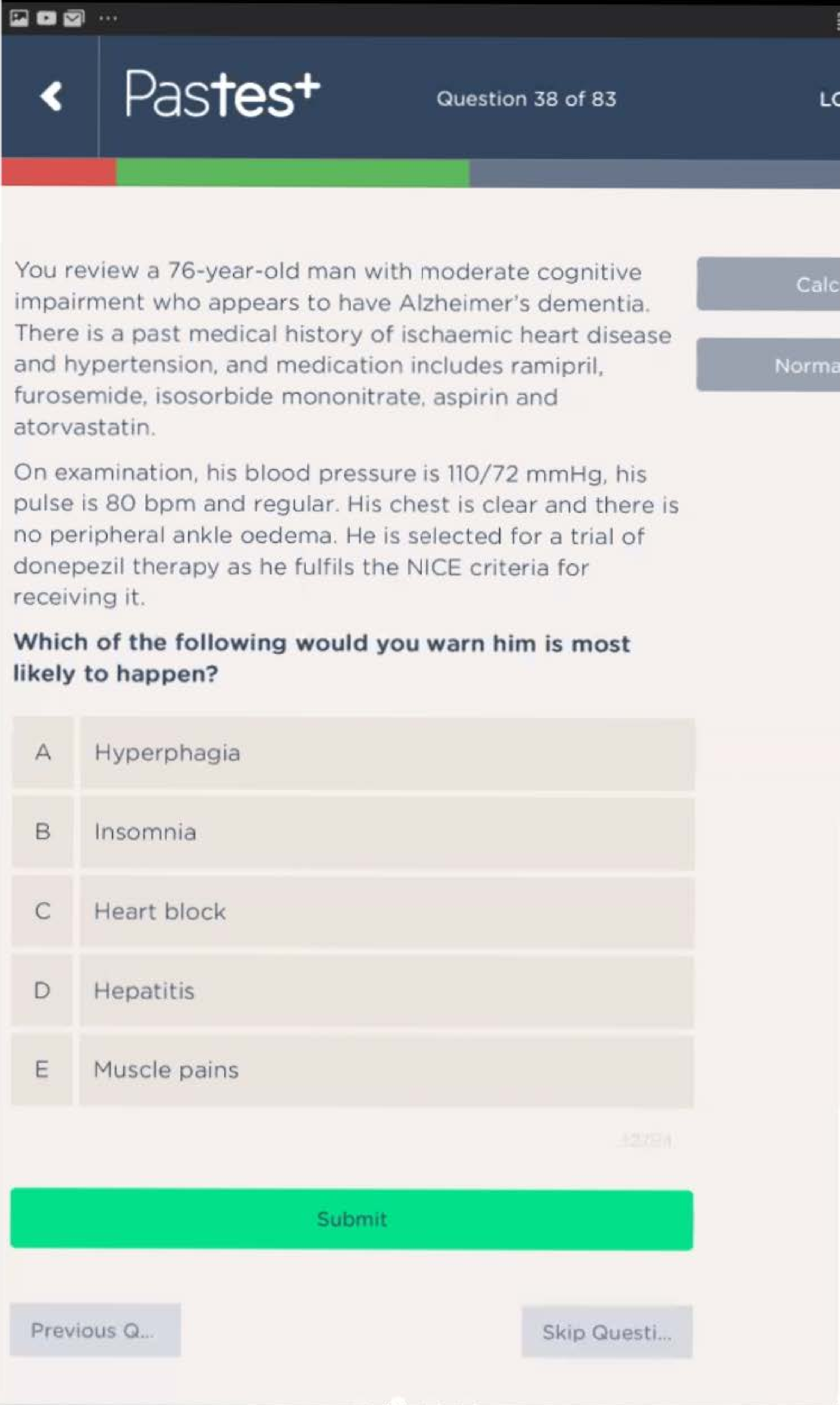
iv heparin is at greater risk of inducing Type 2 HIT and no more effective than LMWH, as such there is no advantage in changing here.

C Stop LMWH and start lepirudin

Like danaparoid, this is an option for the treatment of patients with Type 2 HIT.

D Add in warfarin

At this stage, there is no advantage in adding in warfarin therapy, the LMWH should merely be continued. Adding in



You review a 76-year-old man with moderate cognitive impairment who appears to have Alzheimer's dementia. There is a past medical history of ischaemic heart disease and hypertension, and medication includes ramipril, furosemide, isosorbide mononitrate, aspirin and atorvastatin.

On examination, his blood pressure is 110/72 mmHg, his pulse is 80 bpm and regular. His chest is clear and there is no peripheral ankle oedema. He is selected for a trial of donepezil therapy as he fulfils the NICE criteria for receiving it.

Which of the following would you warn him is most likely to happen?

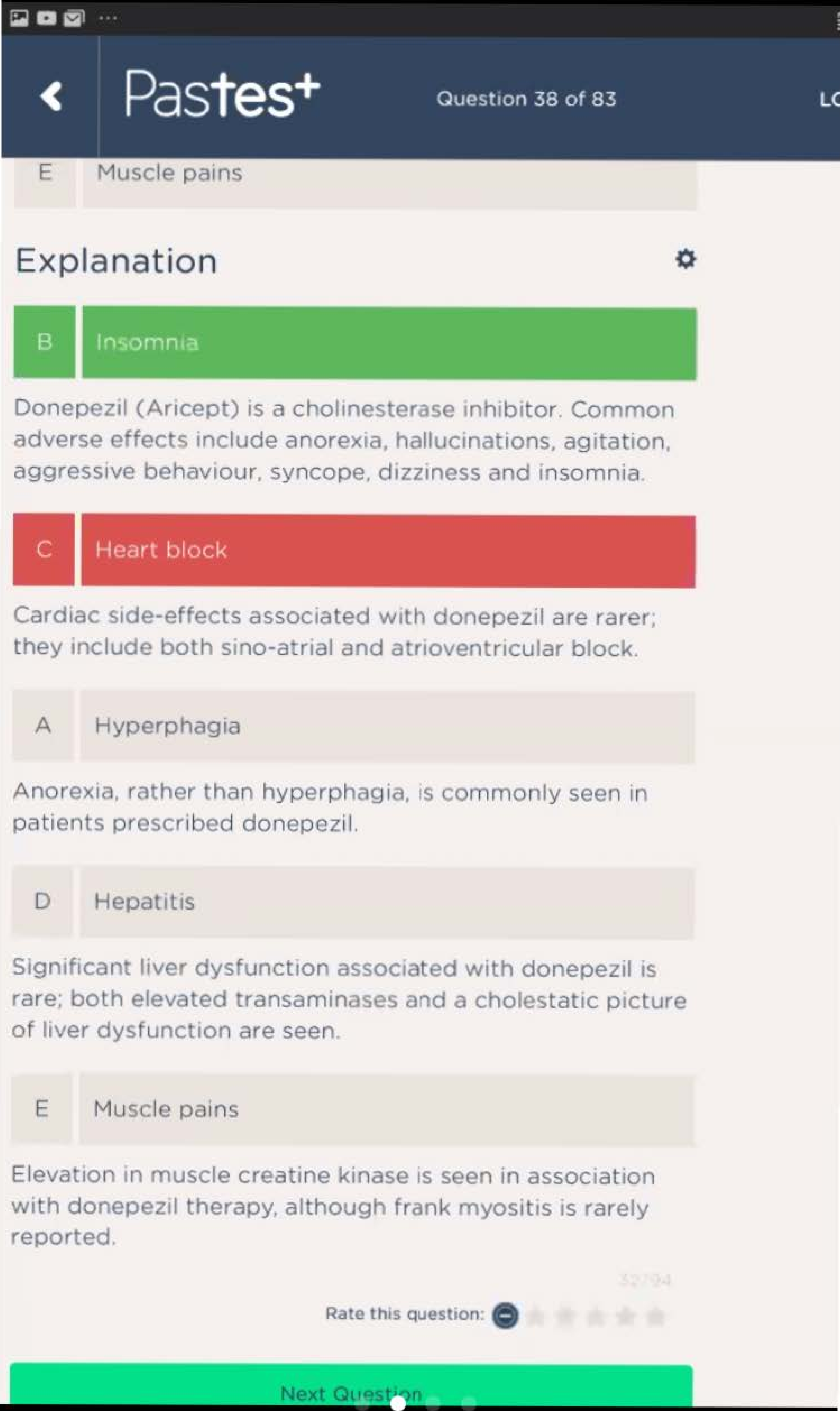
A Hyperphagia

B Insomnia

C Heart block

D Hepatitis

E Muscle pains



E Muscle pains

Explanation

B Insomnia

Donepezil (Aricept) is a cholinesterase inhibitor. Common adverse effects include anorexia, hallucinations, agitation, aggressive behaviour, syncope, dizziness and insomnia.

C Heart block

Cardiac side-effects associated with donepezil are rarer; they include both sino-atrial and atrioventricular block.

A Hyperphagia

Anorexia, rather than hyperphagia, is commonly seen in patients prescribed donepezil.

D Hepatitis

Significant liver dysfunction associated with donepezil is rare; both elevated transaminases and a cholestatic picture of liver dysfunction are seen.

E Muscle pains

Elevation in muscle creatine kinase is seen in association with donepezil therapy, although frank myositis is rarely reported.

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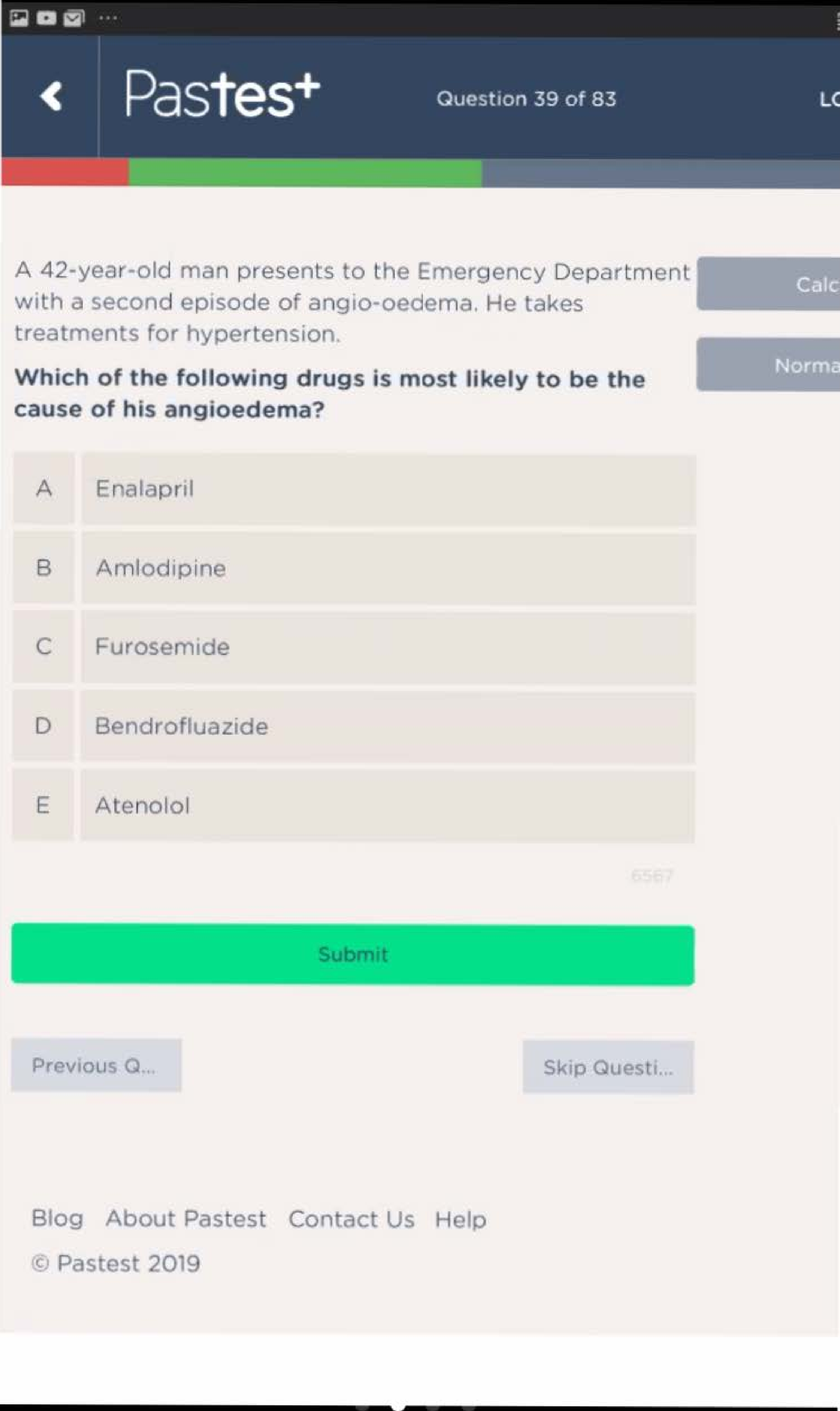

Question 39 of 83

A 42-year-old man presents to the Emergency Department with a second episode of angio-oedema. He takes treatments for hypertension.

Which of the following drugs is most likely to be the cause of his angioedema?

A	Enalapril
B	Amlodipine
C	Furosemide
D	Bendrofluazide
E	Atenolol

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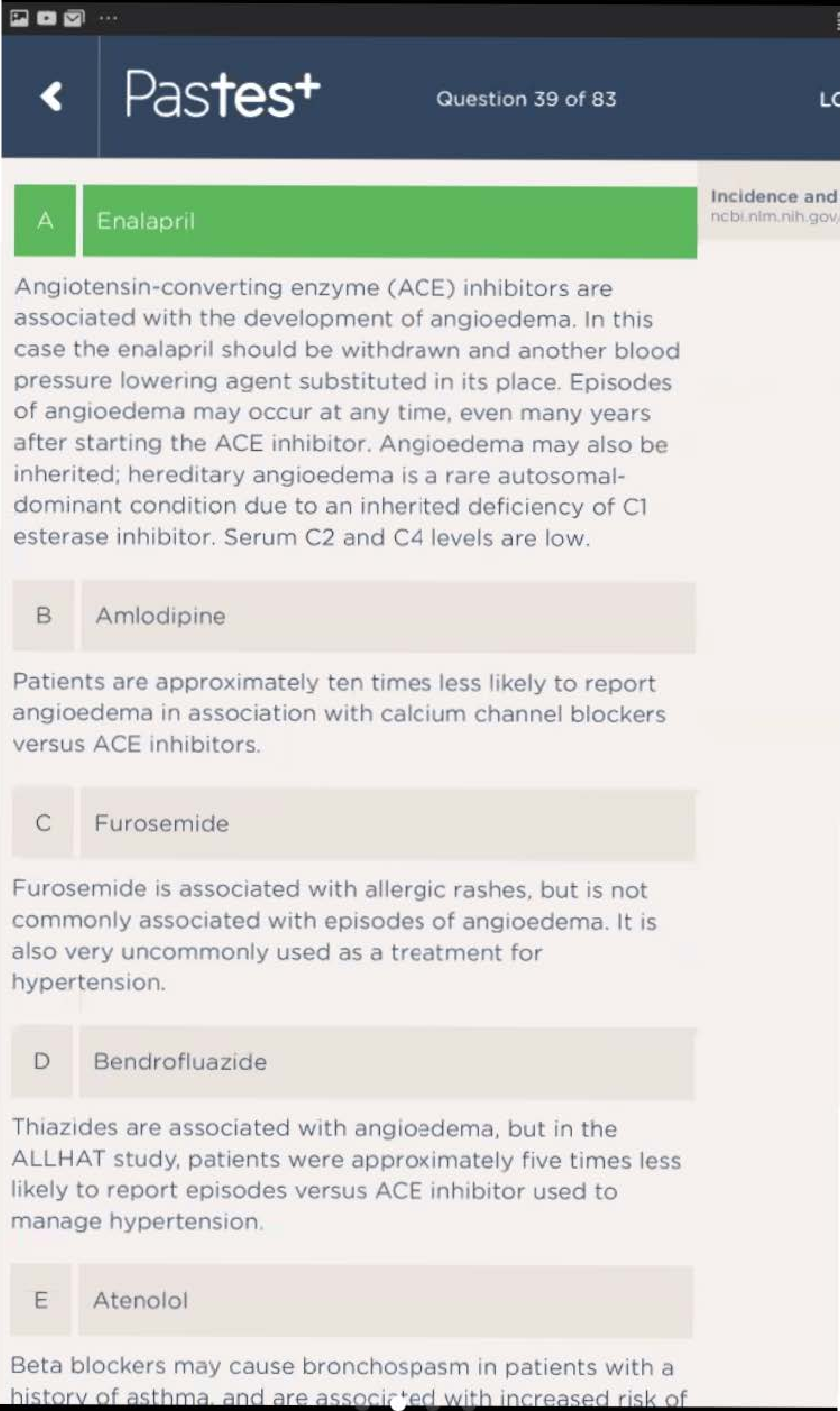


A Enalapril

Angiotensin-converting enzyme (ACE) inhibitors are associated with the development of angioedema. In this case the enalapril should be withdrawn and another blood pressure lowering agent substituted in its place. Episodes of angioedema may occur at any time, even many years after starting the ACE inhibitor. Angioedema may also be inherited; hereditary angioedema is a rare autosomal-dominant condition due to an inherited deficiency of C1 esterase inhibitor. Serum C2 and C4 levels are low.

B Amlodipine

Patients are approximately ten times less likely to report angioedema in association with calcium channel blockers versus ACE inhibitors.

C Furosemide

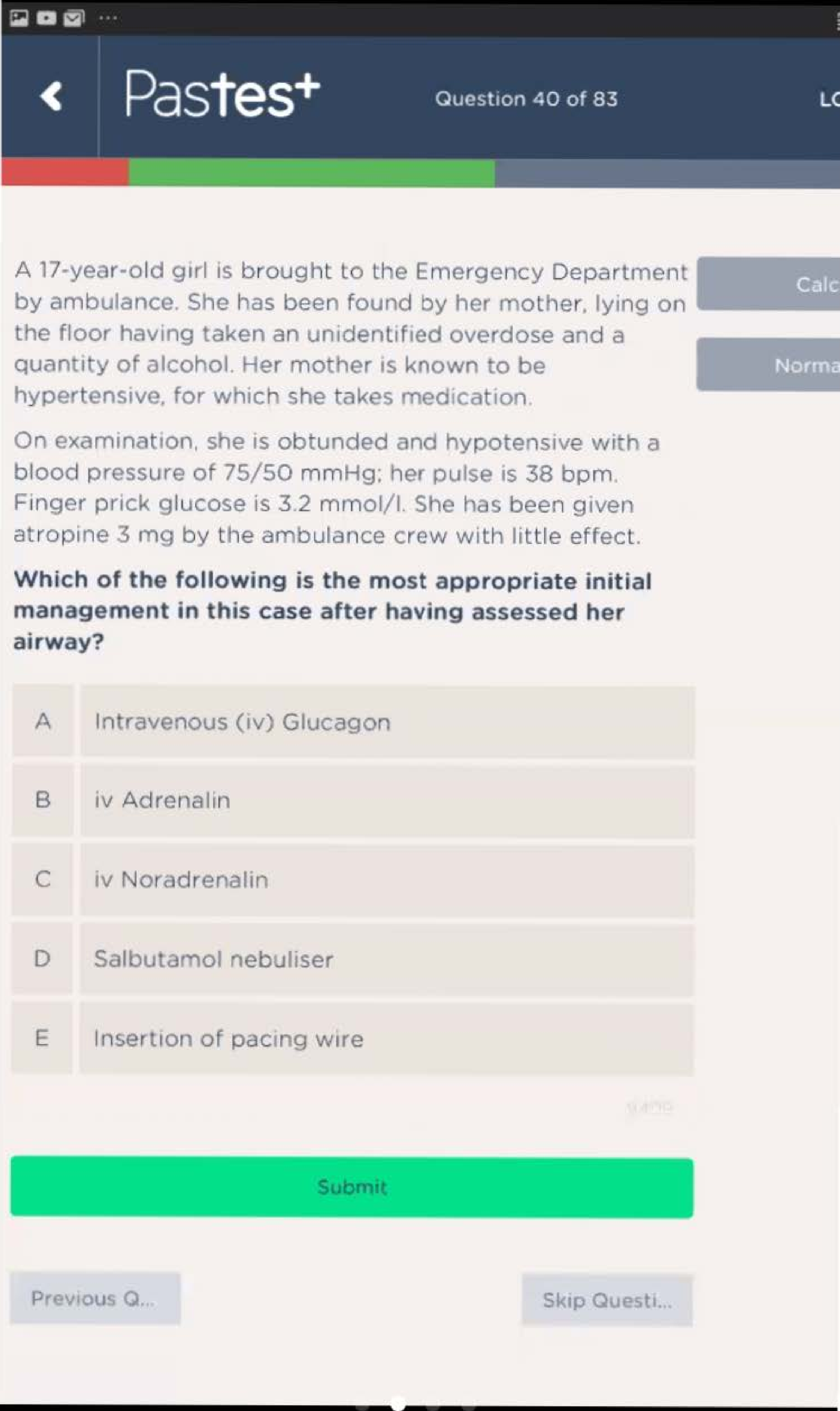
Furosemide is associated with allergic rashes, but is not commonly associated with episodes of angioedema. It is also very uncommonly used as a treatment for hypertension.

D Bendrofluazide

Thiazides are associated with angioedema, but in the ALLHAT study, patients were approximately five times less likely to report episodes versus ACE inhibitor used to manage hypertension.

E Atenolol

Beta blockers may cause bronchospasm in patients with a history of asthma, and are associated with increased risk of

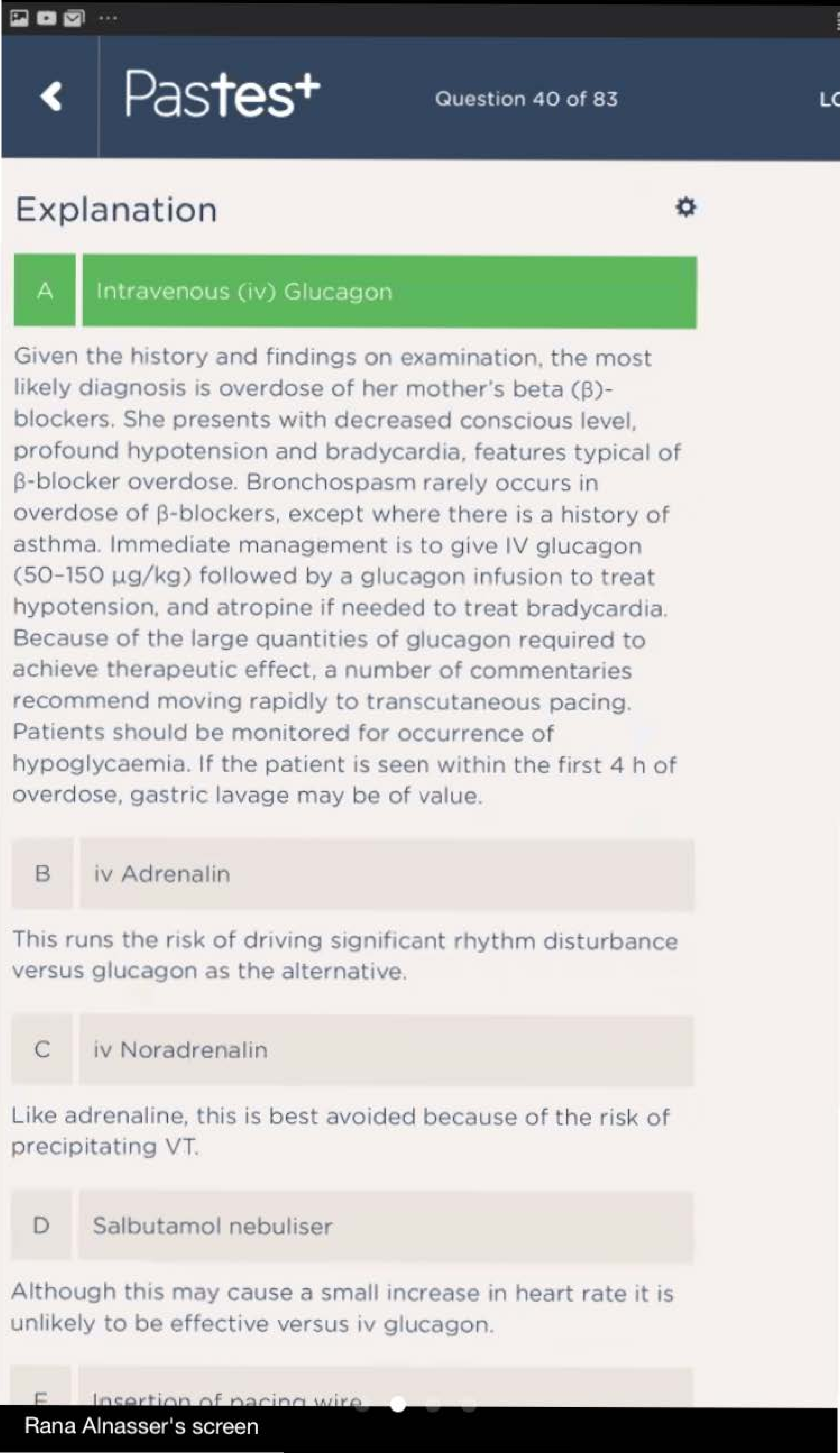


A 17-year-old girl is brought to the Emergency Department by ambulance. She has been found by her mother, lying on the floor having taken an unidentified overdose and a quantity of alcohol. Her mother is known to be hypertensive, for which she takes medication.

On examination, she is obtunded and hypotensive with a blood pressure of 75/50 mmHg; her pulse is 38 bpm. Finger prick glucose is 3.2 mmol/l. She has been given atropine 3 mg by the ambulance crew with little effect.

Which of the following is the most appropriate initial management in this case after having assessed her airway?

- A Intravenous (iv) Glucagon
- B iv Adrenalin
- C iv Noradrenalin
- D Salbutamol nebuliser
- E Insertion of pacing wire



Explanation

A Intravenous (iv) Glucagon

Given the history and findings on examination, the most likely diagnosis is overdose of her mother's beta (β)-blockers. She presents with decreased conscious level, profound hypotension and bradycardia, features typical of β-blocker overdose. Bronchospasm rarely occurs in overdose of β-blockers, except where there is a history of asthma. Immediate management is to give IV glucagon (50–150 μg/kg) followed by a glucagon infusion to treat hypotension, and atropine if needed to treat bradycardia. Because of the large quantities of glucagon required to achieve therapeutic effect, a number of commentaries recommend moving rapidly to transcutaneous pacing. Patients should be monitored for occurrence of hypoglycaemia. If the patient is seen within the first 4 h of overdose, gastric lavage may be of value.

B iv Adrenalin

This runs the risk of driving significant rhythm disturbance versus glucagon as the alternative.

C iv Noradrenalin

Like adrenaline, this is best avoided because of the risk of precipitating VT.

D Salbutamol nebuliser

Although this may cause a small increase in heart rate it is unlikely to be effective versus iv glucagon.

E Insertion of pacing wire

Explanation

Pacemaker complications can be a common problem in the period following insertion and can be divided into early complications (<6 weeks) or late (>6 weeks). Lead dislodgement can occur following trauma or sporadically and can be either atrial or ventricular. Atrial dislodgment affects up to 3% of people whereas ventricular is less common affecting 1%. The ECG in atrial lead displacement would show an ECG with loss of atrial sensing and capture in a dual chamber or single chamber pacemaker.

Loss of sensing and capture around the QRS complex, in this case, describes ventricular lead displacement; this is not the case here as this patient has a single chamber pacemaker.

Twiddler's syndrome is when the patient intentionally or accidentally turns the pacemaker on its longitudinal axis which can cause lead dislodgement.

Reel's syndrome is Twiddler's syndrome but on the horizontal axis. There is no reason to suspect either of these syndromes above.

On occasion lead displacement can be seen on chest X-Ray, however, this is not the case here. A lateral chest X-Ray may be of use in this scenario.

Further Reading:

Types of pacemakers for Bradycardia

Pacemaker Lead Displacement: Mechanisms And Management

Common Pacemaker Problems: Lead and Pocket Complications

Incidence of lead dislodgement, malfunction and perforation during the first year following device implantation

Pre-excitation Syndromes

An 18-year-old woman is admitted with a history of breathing difficulty for the past hour. She is taking carbamazepine 800 mg daily for recently diagnosed epilepsy with generalised tonic-clonic seizures. Her mother confesses at the consultation that her daughter had been a difficult child, has aggressive outbursts and often speaks to imaginary people. A psychiatrist has started her on haloperidol.

She had been admitted to the surgical unit a couple of months previously for suspected appendicitis and then discharged the following morning as the pain had spontaneously improved. On examination she is anxious, uncooperative and disoriented. Respiratory rate is 28/min, pulse 130/min and blood pressure 180/106 mmHg. Cranial nerves are normal. Limbs are profoundly weak (2-3/5). Tendon reflexes are absent, with equivocal plantars.

Investigations:

Hb	13 g/dl
WCC	10×10^9/l
Na^+	119 mmol/l
K^+	4.0 mmol/l
Urea	3.0 mmol/l
Glucose	6.0 mmol/l
paO_2	11 kPa
$paCO_2$	9 kPa
pH	7.2

She is moved to the intensive therapy unit and intubated.

Given the suspected diagnosis, what is the most appropriate next intervention?

A Further carbamazepine

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Given the suspected diagnosis, what is the most appropriate next intervention?

A	Further carbamazepine
B	IV acyclovir
C	IV 5% glucose in 0.9% sodium chloride
D	IV phenytoin infusion
E	IV furosemide

C IV 5% glucose in 0.9% sodium chloride

Abdominal pain with no tenderness and low sodium, peripheral neuropathy and epileptic seizures made worse by certain drugs (like carbamazepine) raises a strong possibility of acute intermittent porphyria, an autosomal dominant condition. Signs include tachycardia, hypertension and lower motor neuron weakness mimicking Guillain-Barré syndrome (axonal polyneuropathy). High doses of glucose (400 g/day) can inhibit haem synthesis and are useful for treatment of mild attacks. The patient should receive a high-carbohydrate diet during an acute episode. If the patient is unable to eat, IV glucose should be administered. Dextrose water solutions should not be given because of the risk of exacerbating hyponatraemia.

IV haematin can be started once available, and should be continued over 3-4 days.

A Further carbamazepine

Carbamazepine can provoke episodes of acute intermitten porphyria and is therefore contraindicated. Other drugs such as barbiturates, sulphonamides, phenytoin, valproic acid, alcohol, griseofulvin, synthetic oestrogens and progesterone, and ergots are unsafe.

B IV acyclovir

The chronic nature of this patient's symptoms makes a diagnosis of viral encephalitis very unlikely.

D IV phenytoin infusion

Phenytoin, like carbamazepine, may provoke episodes of AIP, and should therefore be avoided here.

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Although this patient is hypertensive with hyponatraemia, diuretics have no role in the treatment of the condition.

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A 25-year-old patient is transferred from the Psychiatric Unit with rigors and pyrexia. She had been originally admitted with acute psychosis. The patient is confused and sweating profusely. Observations are shown below:

Temperature	38.5 °C
Pulse	120/min
BP	175/85 mmHg
Respiratory rate	30/min
Oxygen saturations	99%

She is drooling saliva and is tremulous with generalised muscle rigidity.

Initial investigations:

Hb	13.6 g/dl
WCC	12.7×10^9/l
PLT	390×10^9/l
pH	7.13
$pa(O_2)$	15.5 kPa
$pa(CO_2)$	3.5 kPa
HCO_3^-	14 mmol/l

What test would best confirm the most likely diagnosis?

A Blood cultures

B Creatine kinase

C Clotting studies

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A	Blood cultures
B	Creatine kinase
C	Clotting studies
D	Serum Calcium
E	Liver function tests

B Creatine kinase

Neuroleptic malignant syndrome is thought to arise from blockage of dopamine receptors or decrease in availability of dopamine. It typically occurs in patients who have recently been commenced on antipsychotic medications o had a recent dose change and it has been reported in patients who have had their antiparkinsonian treatment withdrawn. The mortality is between 10-20%. Patients are hyperthermic, diaphoretic with tremors and generalised muscle rigidity. Investigations will reveal a metabolic acidosis with a raised creatine kinase (or urinary myoglobi where urine dipstick is positive for blood but no cells are seen). Treatment includes close monitoring with intravenous hydration, cessation of neuroleptics and temperature control. In patients who fail to respond, anti-cholinergics are the next step.

A Blood cultures

Although this patient is pyrexial, the temperature is much more likely to be related to neuroleptic driven hyperthermia.

C Clotting studies

Clotting may be deranged in the context of neuroleptic malignant syndrome, but this won't reveal the underlying diagnosis.

D Serum Calcium

The muscle rigidity here is not driven by hypercalcaemia, but is instead driven by increased muscle tone related to decreased availability of dopamine.

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E Liver function tests

Transaminases as well as CK may be elevated as a result of muscle necrosis, but liver function tests won't differentiate their origin.

An 18-year-old female student is being investigated in the clinic for weight loss and diarrhoea. The symptoms started about one year ago and she has been progressively losing weight. She is in the clinic with her parents, who are extremely concerned for their daughter.

Investigations:

Hb	11.2 g/dl
WCC	4.2 × 10^9/l
PLT	160 × 10^9/l
Na+	132 mmol/l
K+	3.1 mmol/l
Creatinine	55 µmol/l
ESR	6.0 mm/h
MCV	83 fl
CRP	4.0 mg/l
Urea	2.5 mmol/l
Upper gastrointestinal (GI) endoscopy	Normal appearances with normal duodenal biopsies
Colonoscopy	Melanosis coli

What is the most likely cause of the symptoms?

A	Senna abuse
B	Lactulose abuse
C	Sodium docusate abuse

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What is the most likely cause of the symptoms?

A	Senna abuse
B	Lactulose abuse
C	Sodium docusate abuse
D	Methylcellulose abuse
E	Colchicine use

A Senna abuse

Anthraquinone laxative derivatives such as senna are absorbed in the large intestine, where they lead to cellular apoptosis, resulting in brown pigmentation of the colonic mucosa, so-called melanosis coli.

C Sodium docusate abuse

Sodium docusate, like lactulose, is primarily a stool softene and does not lead to colonic mucosal cell apoptosis and melanosis coli.

B Lactulose abuse

Lactulose is an osmotic laxative which increases intraluminal/stool water, resulting in softening; it does not lead to colonic pigmentation.

D Methylcellulose abuse

Methylcellulose is a bulk-forming laxative and must be taken with large amounts of fluids to achieve its laxative effect.

E Colchicine use

Colchicine is rarely used, normally for the treatment of gout in patients where other interventions are unsuitable. I is therefore doubtful as to how this patient would have gained access to the medication. It does not cause melanosis coli.

An 82-year-old patient has been diagnosed with metastati lung cancer. He is on the ward and currently taking 30 mg of oral morphine sustained release twice a day with 60 mg per day of Oramorph PRN for breakthrough pain. Overall, he has taken 60 mg of PRN morphine on each of the last three days.

During the ward round, he complains of vomiting and difficulty keeping his medication down. It is decided to convert his analgesia to a diamorphine subcutaneous infusion pump.

What dose of diamorphine should be placed in the infusion pump over 24 h?

A	20 mg
B	40 mg
C	70 mg
D	90 mg
E	110 mg

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What dose of diamorphine should be placed in the infusion pump over 24 h?

Your answer was correct

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B	40 mg
C	70 mg
D	90 mg
E	110 mg

Explanation

B 40 mg

This patient is requiring 120 mg in total of oral morphine

B 40 mg

This patient is requiring 120 mg in total of oral morphine per day. The recommended conversion factor for oral morphine to s/c diamorphine is approximately one third of the mg dose. Hence, 40 mg is the correct answer.

A 20 mg

This risks significant under-dosing with respect to analgesia, and breakthrough pain.

C 70 mg

This risks significant over-dosing with respect to analgesia, with respiratory depression.

D 90 mg

Like 70 mg, 90 mg of s/c diamorphine risks significant overdosing and therefore respiratory depression.

E 110 mg

110 mg is nearly three times the required dose of s/c diamorphine and potentially risks respiratory arrest due to opiate overdose.

A 40-year-old, previously fit and well farmer is admitted to hospital with shortness of breath. Associated with the shortness of breath are nausea, vomiting and diarrhoea. The patient has widespread expiratory polyphonic wheeze and there are observable muscle fasciculations. According to his wife he has been out for most of the past two days crop spraying his fields.

On examination, there is bilateral pupillary constriction, his blood pressure (BP) is 95/50 mmHg with a pulse of 38 bpm.

Which of the following medications is likely to be most beneficial?

A	Physostigmine
B	Phenoxybenzamine
C	Atropine
D	Rocuronium
E	Isoflurophate

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Explanation

C Atropine

This patient presents with organophosphate poisoning,

Explanation

C **Atropine**

This patient presents with organophosphate poisoning, probably due to unintentional exposure as a result of his crop-spraying activity. Organophosphates are strong cholinesterase inhibitors. Symptoms are mainly those of muscarinic and nicotinic overstimulation. Before arrival into hospital the patient should be decontaminated. Atropine is used as a muscarinic receptor antagonist; as well as treating bradycardia, it also relieves bronchospasm and diminishes excess respiratory secretions.

Pralidoxime is a cholinesterase activator and can reverse organophosphate-driven inhibition of cholinesterase. It should be given as soon as possible in addition to atropine Time to admission of pralidoxime and atropine is closely linked to chances of survival.

A Physostigmine

Physostigmine is a cholinesterase inhibitor which will worsen symptoms of organophosphate poisoning, not improve them.

B Phenoxybenzamine

Phenoxybenzamine is an α-receptor blocker and is for treatment of hypertension caused by phaeochromocytomas.

D Rocuronium

Rocuronium is a competitive neuromuscular blocker and can be used to facilitate intubation.

A 21-year-old woman, who is eight weeks pregnant, presents for review with very difficult to control nausea and vomiting. She is very worried as she feels unable to eat and is concerned that she is losing weight. She has tried home remedies such as ginger, and has been resting as much as possible. She is tolerating oral fluids but very little solid foods. You are considering starting medication.

Investigations:

Hb	12.1 g/dl
WCC	5.4 × 10⁹/l
PLT	201 × 10⁹/l
Na⁺	140 mmol/l
K⁺	3.4 mmol/l
Creatinine	115 µmol/l

Which of the following would be the most appropriate medication for her?

A Domperidone

B Promethazine

C Metoclopramide

D Ondansetron

E Chlorpromazine

B Promethazine

NICE suggests that antihistamines such as cyclizine or promethazine are the recommended first line options for the medical management of nausea and vomiting in pregnancy. This is due to high levels of effectiveness, lack of extra-pyramidal side effects and good overall tolerabilit profile in this class of drugs.

A Domperidone

The dopamine antagonist domperidone can be used in the treatment of nausea and vomiting in pregnancy, however antihistamines are preferred as there is no risk of extra-pyramidal side effects with antihistamine use.

C Metoclopramide

Metoclopramide is not used as a first line agent in the management of nausea and vomiting in pregnancy due to the increased risk of extrapyramidal side effects. These sid effects are particularly common in the younger population.

D Ondansetron

Ondansetron is thought to be safe for the treatment of nausea and vomiting in pregnancy, although exposure dat are limited. Of the options available, promethazine is the most appropriate first line treatment.

E Chlorpromazine

Pyridoxine is not recommended in pregnancy induced nausea and vomiting as there is a lack of consistent evidence available for its effectiveness. High doses may be

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E Chlorpromazine

Pyridoxine is not recommended in pregnancy induced nausea and vomiting as there is a lack of consistent evidence available for its effectiveness. High doses may be required to treat symptoms however doses greater than 50mg a day can cause peripheral neuropathy.

20630

A 32-year-old man is arrested after a flight from Jamaica and brought to the hospital for assessment as he becomes increasingly agitated.

Abdominal X-ray reveals evidence of ingestion of a number of packets of drugs, presumed to be cocaine.

What is the management of choice in this case?

A	Gastric lavage and activated charcoal
B	Urgent surgical referral
C	Observation
D	Colonic wash-out
E	Laxative administration

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Explanation

B	Urgent surgical referral

As this patient is symptomatic, following the royal college of Emergency medicine guidelines they should have an urgent surgical referral.

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A Gastric lavage and activated charcoal

Institution of fluid and charcoal potentially increases the risk of package rupture and should therefore be avoided.

C Observation

Given one of the packages at least appears to be leaking, observation risks waiting too long for them to exit the body.

D Colonic wash-out

Colonic washout utilises quite large volumes of water, increasing the risk of packet rupture.

E Laxative administration

This practice is known as 'body packing' and is particularly associated with the smuggling of cocaine. The risk of toxicity from rupture or leakage of the package is not insignificant. Body packers and body stuffers may be asymptomatic when brought in by police. The body packers, also called mules, pack their gastrointestinal tract with bags of cocaine (or other illicit drugs) in order to smuggle the drug from one country to another. In contrast body stuffers hastily insert packages into the mouth, rectum, or vagina in order to conceal the evidence from police at the time of their arrest. Following the Royal College of Emergency Medicine guidance, if the patient is

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You review the pharmacokinetic and pharmacodynamic properties of a new agent for the treatment of epilepsy, and are aware that other agents used for the treatment of epilepsy may require therapeutic drug monitoring.

Which of the following is likely to drive a requirement for pharmacokinetic monitoring?

A	Zero-order kinetics
B	First-order kinetics
C	High first pass metabolism
D	Complementary mode of action to other antiepileptics
E	Inhibition of CYP3A4

A Zero-order kinetics

With drugs that obey zero-order kinetics, such as phenytoin and ethanol, their enzyme metabolism is saturable, which means only a certain amount of the drug can be eliminated over a period of time. This means that fo relatively small increases in administered drug, relatively large increases in plasma concentration may occur, leading to potential drug toxicity. This makes zero-order kinetics a key driver for therapeutic drug monitoring.

E Inhibition of CYP3A4

Inhibition of CYP3A4 may require drug interaction studies looking at the effect of this drug on the metabolism of others, rather than studies looking at the concentration of the drug itself.

B First-order kinetics

Where drugs display first-order kinetics, the rate at which drug is metabolised and eliminated is generally proportional to the dose given, with an exponential reduction in plasma concentration over time. Each half-life of a drug displaying first-order kinetics is associated with 50% reduction in plasma concentration, and drugs may be considered eliminated after 3-5 half-lives. This predictable PK is associated with less need for therapeutic drug monitoring.

C High first pass metabolism

High first pass metabolism does not stratify a need for therapeutic drug monitoring evaluation of active metabolites in this case is more important with respect to th [illegible] itoring or not.

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C	High first pass metabolism

High first pass metabolism does not stratify a need for therapeutic drug monitoring; evaluation of active metabolites in this case is more important with respect to the need for monitoring or not.

D	Complementary mode of action to other antiepileptics

This drives a requirement for PD interaction studies rather than for therapeutic drug monitoring.

An 18-year-old student has attended the Emergency Department of a district general hospital, having consumed a bottle of antifreeze for a bet. On arrival, he appears rather unwell, with bloods indicating that he has a high anion gap metabolic acidosis, and an elevated osmolar gap

On examination, his BP is 100/60 mmHg, pulse is 95 bpm and regular, and he is drowsy. Arterial blood gasses reveal a severe metabolic acidosis. He can currently be admitted to the high-dependency unit, but there are no ITU beds.

Which of the following would be the most appropriate treatment for his antifreeze poisoning?

A Ethanol

B Methanol

C Fomepizole

D Naloxone

E Methylene blue

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Your answer was correct

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B	Methanol
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Explanation

C Fomepizole

Ethylene glycol poisoning is one of the classic causes of a high anion gap metabolic acidosis. A few of the causes can

Explanation

C Fomepizole

Ethylene glycol poisoning is one of the classic causes of a high anion gap metabolic acidosis. A few of the causes can be remembered using the mnemonic MUDPILES: methanol uraemia, diabetic ketoacidosis, paraldehyde, iron, lactate, ethylene glycol and salicylate. Ethylene glycol is metabolised by the enzyme alcohol dehydrogenase, initially to glycoaldehyde, then forming glycolic acid, glyoxylic acid and finally oxalic acid. Fomepizole is an inhibitor of alcohol dehydrogenase but does not lead to intoxication; it is therefore preferred here to ethanol.

Useful mnemonic

The mnemonic 'MUDPILES' (methanol, uraemia, diabetic ketoacidosis, paraldehyde, iron, lactate, ethylene glycol and salicylate) can be used to remember some of the causes of high anion gap metabolic acidosis.

A Ethanol

Ethanol is a competitive antagonist for alcohol dehydrogenase but has the disadvantage here that it increases intoxication.

B Methanol

Methanol has a significant negative toxicity profile, leading to metabolic acidosis and optic neuropathy; hence it is not an appropriate intervention here.

D Naloxone

Naloxone is a reversal agent for opiates.

A 57-year-old man attends the outpatient clinic. He has a background of hypertension, hyperlipidaemia, diabetes, and gastroesophageal reflux disease. The patient has recently returned from a holiday in Europe.

While on vacation, he suffered a heart attack and was admitted to hospital. He states his heart went into a 'funny rhythm' which required medication to control it. The patient remembers a particularly bad stay in the coronary care unit when he had symptoms of vomiting, vertigo, tinnitus, headache and blurred vision.

What medication is most likely to have caused these symptoms?

A Amiodarone
B Digoxin
C Quinidine
D Lignocaine
E Flecainide

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What medication is most likely to have caused these symptoms?

Your answer was incorrect

A	Amiodarone
B	Digoxin
C	Quinidine
D	Lignocaine
E	Flecainide

Explanation

C Quinidine

Quinidine is a class 1A antiarrhythmic drug that slows the

Explanation

C **Quinidine**

Quinidine is a class 1A antiarrhythmic drug that slows the rapid depolarisation that occurs during phase 0 of the cardiac action potential. It is used for the treatment of atrial and ventricular arrhythmias, and is related to the antimalarial quinine. The constellation of symptoms described are those of cinchonism. This can be brought on by both acute and chronic treatment with quinidine and quinine. It can also cause a prolonged QT interval on the electrocardiogram. (Cinchona is the name of the tree from which quinine can be obtained.)

B **Digoxin**

Digoxin toxicity is associated with vomiting and visual disturbance, but it is more likely to be associated with yellowing of vision.

A **Amiodarone**

Amiodarone therapy is associated with both pulmonary fibrosis and skin photosensitivity, rather than the symptoms seen here.

D **Lignocaine**

Lignocaine is not associated with symptoms of cinchonism it is associated with sensation of dizziness and tunnel vision.

E **Flecainide**

Flecainide is associated dizziness and blurred vision but

electrocardiogram. (Cinchona is the name of the tree from which quinine can be obtained.)

B	Digoxin

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Amiodarone therapy is associated with both pulmonary fibrosis and skin photosensitivity, rather than the symptoms seen here.

D	Lignocaine

Lignocaine is not associated with symptoms of cinchonism, it is associated with sensation of dizziness and tunnel vision.

E	Flecainide

Flecainide is associated dizziness and blurred vision, but not with the vomiting and tinnitus seen here.

7049

You are called to see a 26-year-old man on the ward. He was admitted for the treatment of cellulitis, and has a background of depression. He has become unwell with confusion, abdominal pain, vomiting and diarrhoea the morning after admission.

The nurses have also noticed that when he opened his bowels the stool was dark black. His pulse was 100 bpm, blood pressure 110/60 mmHg and respiratory rate 24/min.

Initial investigations:

Hb	14 g/dl
WCC	13.5×10^9/l
PLT	250×10^9/l
INR	1.1
Na$^+$	143 mmol/l
K$^+$	4.3 mmol/l
Urea	11 mmol/l
Glucose	7 mmol/l
Creatinine	100 μmol/l
Erect chest and abdominal X-rays	Multiple rounded radio-opacities in the small intestine
Iron level	90 μmol/l (12–30 μmol/l)

IV fluids are commenced, as is a laxative preparation.

What is the next appropriate management step?

A	Oral activated charcoal
B	Oral desferrioxamine

The nurses have also noticed that when he opened his bowels the stool was dark black. His pulse was 100 bpm, blood pressure 110/60 mmHg and respiratory rate 24/min.

Initial investigations:

Hb	14 g/dl
WCC	13.5 × 10^9/l
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Erect chest and abdominal X-rays	Multiple rounded radio-opacities in the small intestine
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IV fluids are commenced, as is a laxative preparation.

What is the next appropriate management step?

A	Oral activated charcoal
B	Oral desferrioxamine
C	Cautious venesection
D	Haemodialysis
E	Parenteral desferrioxamine

Na⁺	143 mmol/l
K⁺	4.3 mmol/l
Urea	11 mmol/l
Glucose	7 mmol/l
Creatinine	100 µmol/l
Erect chest and abdominal X-rays	Multiple rounded radio-opacities in the small intestine
Iron level	90 µmol/l (12–30 µmol/l)

IV fluids are commenced, as is a laxative preparation.

What is the next appropriate management step?

Your answer was correct

A	Oral activated charcoal
B	Oral desferrioxamine
C	Cautious venesection
D	Haemodialysis
E	Parenteral desferrioxamine

Explanation

E Parenteral desferrioxamine

E Parenteral desferrioxamine

This is a case of iron overdose. Initial stages are of abdominal pain, vomiting and diarrhoea with gastrointestinal blood loss. There can also be a lucid period where the person appears well and then becomes progressively drowsier. X-rays can reveal the tablets in the bowel. Serum iron indicates the severity of the overdose, with severe toxicity at >90 µmol/l. Parenteral desferrioxamine to chelate iron is the intervention of choice.

A Oral activated charcoal

Charcoal does not bind iron sulphate tablets and therefore has no value. As the pills in this case are in the small intestine it is recommended to cleanse the bowel with a polyethylene glycol electrolyte solution (Klean-Prep). Gastroscopy does not reach far enough to retrieve the tablets.

B Oral desferrioxamine

Oral absorption of desferrioxamine is too little and unpredictable to reliably treat iron overdose, as such IV delivery is preferred.

C Cautious venesection

Venesection is indicated in the treatment of haemochromatosis, but has no role in the treatment of iron overdose.

D Haemodialysis

Haemodialysis is indicated in patients where iron chelation

A 32-year-old man is readmitted to the hospital some 14 days after his renal transplant. He has begun feeling very unwell with flu-like symptoms, a headache and sore throat. He has been checking his temperature at home and is now spiking fevers of 38.5 °C.

On examination, he looks poorly, with pyrexia of 38.2 °C in the Emergency room and evidence of pharyngitis. On reviewing his notes, you see that he was CMV-, Hep B- and Hep C- negative before his transplant.

Investigations:

Hb	11.9 g/dl
WCC	6.1×10^9/l
PLT	235×10^9/l
ESR	49 mm/hr
Na^+	139 mmol/l
K^+	5.0 mmol/l
Creatinine	105 µmol/l

Which of the following would be the most appropriate treatment for him?

A	Intravenous (iv) ganciclovir
B	iv Foscarnet
C	iv Vancomcin and teicoplanin
D	iv benzylpenicillin and gentamycin
E	iv aciclovir

Pastest+

Question 12 of 128

A Intravenous (iv) ganciclovir

The most likely diagnosis here is one of CMV infection post-renal transplant, for which IV ganciclovir is the default treatment choice. It is very likely that the kidney has come from a CMV-positive donor. Symptoms of CMV infection post-transplant can appear any time from 6-60 days after surgery and are characterised by pyrexia, flu-like symptoms or an infectious mononucleosis-type picture as seen here. Indeed, transplant surgeons now consider the option of prophylactic ganciclovir in patients who are CMV- but their transplanted kidney comes from a CMV+ donor. The concern is that active CMV infection is associated with accelerated failure of the transplanted kidney.

B iv Foscarnet

Ganciclovir is preferred to foscarnet as a treatment option because of adverse events associated with foscarnet therapy, including marrow suppression.

C iv Vancomcin and teicoplanin

This would be an option for bacterial sepsis as a result of the transplant. The modest increase in ESR and normal white blood count make a viral infection more likely.

D iv benzylpenicillin and gentamycin

This would be a reasonable option for the treatment of bacterial endocarditis.

E iv aciclovir

Although acyclovir was previously used for CMV prophylaxis, valganciclovir is now preferred...

B iv Foscarnet

Ganciclovir is preferred to foscarnet as a treatment option because of adverse events associated with foscarnet therapy, including marrow suppression.

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This would be a reasonable option for the treatment of bacterial endocarditis.

E iv aciclovir

Although acyclovir was previously used for CMV prophylaxis, valgancyclovir is now preferred.

A 34-year-old woman is seen in the Diabetic Clinic. She was diagnosed with type II diabetes 18 months previously, and has been on treatment with metformin. Her HbA1c is 50.82 mmol/mol (6.8%), and blood pressure (BP) is 136/75 mmHg. She has no microalbuminuria. In spite of dietary advice and modification, she remains obese, with a body mass index (BMI) of 35 kg/m^2.

Which of the following is the most appropriate intervention with respect to weight control?

A	Further diet and exercise
B	Albiglutide 30 mg
C	Canagliflozin
D	Orlistat
E	Liraglutide 3 mg

6401

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A 34-year-old woman is seen in the Diabetic Clinic. She was diagnosed with type II diabetes 18 months previously, and has been on treatment with metformin. Her HbA1c is 50.82 mmol/mol (6.8%), and blood pressure (BP) is 136/75 mmHg. She has no microalbuminuria. In spite of dietary advice and modification, she remains obese, with a body mass index (BMI) of 35 kg/m².

Which of the following is the most appropriate intervention with respect to weight control?

Your answer was incorrect

A Further diet and exercise

B Albiglutide 30 mg

C Canagliflozin

D Orlistat

E Liraglutide 3 mg

Explanation

E Liraglutide 3 mg

This patient is obese with relatively good HbA1c control. As such rather than an intervention for glucose control, an intervention for weight loss is more appropriate. Liraglutide is licensed for weight loss at the 3 mg dose, and was shown in the SCALE diabetes study to drive significant weight loss (6% versus baseline over 52 weeks; see link for

E Liraglutide 3 mg

This patient is obese with relatively good HbA1c control. As such rather than an intervention for glucose control, an intervention for weight loss is more appropriate. Liraglutide is licensed for weight loss at the 3 mg dose, and was shown in the SCALE diabetes study to drive significant weight loss (6% versus baseline over 52 weeks; see link for JAMA article).

C Canagliflozin

Canagliflozin is primarily an SGLT-2 inhibitor which reduces glucose reabsorption in the kidney, promoting carbohydrate loss. It is licensed for control of blood glucose in type II diabetes, not for weight loss.

A Further diet and exercise

Given this patient has not lost a significant amount of weight with lifestyle intervention, further measures are required.

B Albiglutide 30 mg

Albiglutide 30 mg is used for glucose control in type II diabetes; it does not substantially impact on weight.

D Orlistat

Orlistat does achieve modest weight loss, but it is often poorly tolerated due to side effects related to fat malabsorption.

Rana Alnasser's screen

A 76-year-old woman with known vascular dementia is sent in to the Accident and Emergency (A&E) Department by nursing home staff with a 2-day history of fever, reduced mobility and drowsiness.

Four days earlier, she had been seen by the on-call general practitioner (GP), as she had been agitated and hallucinating. He had started her on haloperidol for this.

In A&E, her temperature is 39.4 °C. She is drowsy with a Glasgow Coma Scale (GCS) score of 12/15 (E3 V4 M5). She has a sinus tachycardia 116 bpm. Blood pressure is 112/56 mmHg and heart sounds are normal. Her chest is clear and her abdomen is soft and non-tender, with normal bowel sounds.

Neurological examination reveals generalised hypertonia, but normal power and reflexes.

Investigations are as follows:

White blood cells (WBC)	8.1 × 10^9/l
Haemoglobin (Hb)	12.4 g/dl
Mean cell volume (MCV)	82.4 fl
Platelets	224 × 10^9/l
Na^+	136 mmol/l
K^+	5.4 mmol/l
Urea	9.6 mmol/l
Creatinine	167 µmol/l
Bilirubin	14 µmol/l
Alanine aminotransferase (ALT)	35 U/l
Alkaline phosphate	124 U/l

Na⁺	136 mmol/l
K⁺	5.4 mmol/l
Urea	9.6 mmol/l
Creatinine	167 µmol/l
Bilirubin	14 µmol/l
Alanine aminotransferase (ALT)	35 U/l
Alkaline phosphate	124 U/l
Albumin	38 g/l
Electrocardiogram (ECG)	Sinus tachycardia
Chest X-ray	Normal cardiac silhouette, no focal consolidation

What test would you request to confirm the diagnosis?

A	Blood cultures
B	Creatine phosphokinase
C	Magnetic resonance imaging (MRI)
D	Urine culture
E	Renal ultrasound scan

8605

Explanation

B Creatine phosphokinase

This patient has neuroleptic malignant syndrome precipitated by the administration of haloperidol. Clinical features of neuroleptic malignant syndrome include:

- Hypertension, tachycardia and pyrexia
- Muscular rigidity (sometimes with dysphagia and dysarthria)
- Extrapyramidal signs, tremor
- Catatonia-muteness
- Increased serum creatine phosphokinase/aspartate aminotransferase (AST)
- Urinary myoglobin.

A Blood cultures

Although this patient has a significant pyrexia, the normal white count and recent commencement of haloperidol steers us away from sepsis as the likely diagnosis.

C Magnetic resonance imaging (MRI)

Although there are extrapyramidal signs and tremor, they are more likely to be related to haloperidol rather than to an acute neurological event.

D Urine culture

Although urine dipstick is expected to be positive for blood (due to urinary myoglobin) culture is uninformative.

An 18-year-old school pupil is brought to the Emergency Department by his mother for evaluation of his progressive unsteadiness over the past two months. He has had a poor record of school attainment since entering the sixth form and has developed a progressively worsening habit of sniffing glue and aerosol deodorants over this time period.

Two years ago, he had jaundice which apparently recovered on its own. One year ago, he had a sudden severe pain in his lower back that radiated to his right groin. He had also complained of intermittent blurring of vision, impaired judgement, irritability and excitability.

On examination, he is pale and seems euphoric, he is hypotensive with a pulse of 90/min and a blood pressure (BP) of 100/60 mmHg. Fundus examination reveals pale optic discs, horizontal nystagmus and bilateral limb and gait ataxia. Distal muscles are weak and atrophic. Ankle jerks are absent and plantar reflexes are flexor.

Given the likely diagnosis, what long-term renal complication is of most concern?

A	Rhabdomyolysis
B	Rapidly progressive glomerulonephritis
C	Distal renal tubular acidosis
D	Focal proliferative glomerulonephritis
E	Mesangiocapillary glomerulonephritis

32811

Volatile substance abuse includes the intentional inhalation of organic solvents, vapours, gasoline, aerosol propellants, glues, etc. They are either 'bagged' (sprayed into a plastic bag and inhaled till the subject passes out) or 'huffed' (sprayed on to a cloth and held to the mouth). Features include euphoria, blurring of vision, ataxia, a feeling of omnipotence, delirium, convulsions and status epilepticus. Glue sniffing leads to nervous system problems including optic atrophy, encephalopathy, cerebellar degeneration and sensorimotor polyneuropathy.

Renal toxicity associated with solvent abuse includes proteinuria, distal renal tubular acidosis and renal calculi.

D	Focal proliferative glomerulonephritis

FPG is seen in 20-30% of cases of lupus nephritis.

A	Rhabdomyolysis

Rhabdomyolysis is seen in association with substance abuse, but it is associated with stimulants such as cocaine and MDMA, rather than solvents.

B	Rapidly progressive glomerulonephritis

Causes of RPGN include SLE, Henoch-Schönlein purpura and post-infectious renal vasculitis.

E	Mesangiocapillary glomerulonephritis

This is seen across a range of causes of renal vasculitis, but isn't seen in patients who abuse solvents.

omnipotence, delirium, convulsions and status epilepticus. Glue sniffing leads to nervous system problems including optic atrophy, encephalopathy, cerebellar degeneration and sensorimotor polyneuropathy.

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E Mesangiocapillary glomerulonephritis

This is seen across a range of causes of renal vasculitis, but isn't seen in patients who abuse solvents.

Rate this question:

Question 16 of 128

A 71-year-old woman who takes regular digoxin for chronic atrial fibrillation comes to the Emergency Department with syncope. She has been unwell with gastroenteritis over the past few days and now feels very weak and faint.

On examination, her BP is 90/50 mmHg, with pulse 35/min; the 12-lead ECG shows atrial flutter with variable ventricular rate. There are no cardiac murmurs, and her chest appears clear with no signs of fluid overload. There is no peripheral oedema. Abdomen is soft and non-tender with no palpable masses.

She complains of nausea and yellow vision and vomits once whilst you are examining her.

Investigations:

Hb	110 g/l
WCC	7.9 × 10^9/l
PLT	210 × 10^9/l
Na^+	140 mmol/l
K^+	6.0 mmol/l
Creatinine	201 umol/l
Urea	15.1 mmol/l
Glucose	7.2 mmol/l

Given the suspected diagnosis, which of the following is the most appropriate next intervention?

A Calcium resonium

B Digibind (Digoxin Immune Fab)

C IV calcium gluconate

Rana Alnasser's screen

the 12-lead ECG shows atrial flutter with variable ventricular rate. There are no cardiac murmurs, and her chest appears clear with no signs of fluid overload. There is no peripheral oedema. Abdomen is soft and non-tender with no palpable masses.

She complains of nausea and yellow vision and vomits once whilst you are examining her.

Investigations:

Hb	110 g/l
WCC	7.9 × 10⁹/l
PLT	210 × 10⁹/l
Na^+	140 mmol/l
K^+	6.0 mmol/l
Creatinine	201 umol/l
Urea	15.1 mmol/l
Glucose	7.2 mmol/l

Given the suspected diagnosis, which of the following is the most appropriate next intervention?

A	Calcium resonium
B	Digibind (Digoxin Immune Fab)
C	IV calcium gluconate
D	IV insulin and dextrose
E	IV normal saline

Explanation

B Digibind (Digoxin Immune Fab)

In this situation digoxin toxicity has resulted in significant symptomatic bradycardia, which has undoubtedly contributed to the patient's hypotension. Although renal perfusion would be improved by fluid replacement, it is crucial to allow the ventricular rate to recover, restoring cardiac output. As such, Digibind to reverse digoxin toxicity is the most appropriate next step.

Indications for Digibind use include:

- Life-threatening or haemodynamically unstable arrhythmia (e.g. ventricular tachycardia; ventricular fibrillation; asystole; complete heart block; Mobitz II heart block; symptomatic bradycardia)
- Hyperkalaemia (serum potassium >5 to 5.5 meq/l [>5 to 5.5 mmol/l])
- Evidence of end-organ dysfunction from hypoperfusion (e.g. kidney disease).

A Calcium resonium

There is not yet a precipitous rise in potassium, and correction of ventricular rate, coupled with fluid replacement is likely to correct hyperkalaemia.

C IV calcium gluconate

Calcium gluconate is indicated for life-threatening hyperkalaemia with ECG changes.

D IV insulin and dextrose

A 35-year-old woman attends the Gastroenterology Clinic. She has a history of alcohol abuse and has recently discovered she is pregnant.

The patient is concerned about fetal alcohol syndrome that she has read about in the newspapers and is asking about the detrimental effects her alcohol consumption would have on her baby.

What advice would you give her?

A A thickened upper lip is a characteristic feature of the syndrome

B Drinking up to 10 units of alcohol per week is potentially healthy for her pregnancy

C Even drinking 1–2 units of alcohol per week confers increased risk

D The IQ may be normal in children affected by the syndrome

E Vitamin supplementation in pregnancy prevents cognitive deficits associated with fetal alcohol syndrome

70805

D The IQ may be normal in children affected by the syndrome

Fetal alcohol syndrome is associated with: (1) mental retardation and/or behavioural abnormalities, (2) growth retardation, and (3) mid-facial abnormalities.

The fetus relies on maternal hepatic detoxification of alcohol. Heavy drinking, including binge consumption of alcohol, is thought to be associated with particular risk. Alcohol appears to cross freely between mother and fetus, yet the fetal liver has only 10% of the capacity of the adult liver to detoxify alcohol. Unfortunately it appears that deficits remain throughout adulthood, with individuals who experience fetal alcohol syndrome much more likely to suffer from behavioural difficulties, alcoholism and to be involved in criminal activity. Of note however is that IQ may be normal or even elevated in some cases.

A A thickened upper lip is a characteristic feature of the syndrome

Thinning of the upper lip is characteristic of the condition.

B Drinking up to 10 units of alcohol per week is potentially healthy for her pregnancy

Drinking 1-2 units of alcohol up to 1-2 times per week is not thought to confer increased risk.

C Even drinking 1-2 units of alcohol per week confers increased risk

Modest alcohol consumption of 1-2 units of alcohol 1-2 times per week is not associated with increased risk of fetal alcohol syndrome.

Question 18 of 128

A 57-year-old man, who is taking long-term amiodarone therapy, comes to the clinic complaining of heat intolerance, anxiety, regular resting palpitations and diarrhoea.

On examination, his blood pressure (BP) is 145/82 mmHg, his resting pulse is elevated at 90/min. He appears to have a multinodular goitre.

Investigations;

		Normal Values
Hb	12.0 g/dl	
WCC	5.0 × 10^9/l	
PLT	178 × 10^9/l	
Na^+	138 mmol/l	
K^+	4.5 mmol/l	
Creatinine	142 μmol/l	
TSH	< 0.05 u/l	< 0.5-4.5
Free T3	8.5 pmol/l	5-10
Free T4	32 pmol/l	10-22
Thyroid autoantibodies	+	
Ultrasound	Multinodular goitre	

You discontinue his amiodarone.

Which of the following other treatments is the most appropriate treatment to control his thyrotoxicosis?

A Radioiodine

		Normal Values
Hb	12.0 g/dl	
WCC	5.0 × 10^9/l	
PLT	178 × 10^9/l	
Na^+	138 mmol/l	
K^+	4.5 mmol/l	
Creatinine	142 μmol/l	
TSH	< 0.05 u/l	< 0.5-4.5
Free T3	8.5 pmol/l	5-10
Free T4	32 pmol/l	10-22
Thyroid autoantibodies	+	
Ultrasound	Multinodular goitre	

You discontinue his amiodarone.

Which of the following other treatments is the most appropriate treatment to control his thyrotoxicosis?

A	Radioiodine
B	Corticosteroids
C	Carbimazole
D	Potassium perchlorate
E	Thyroidectomy

Free T3	8.5 pmol/l	5-10
Free T4	32 pmol/l	10-22
Thyroid autoantibodies	+	
Ultrasound	Multinodular goitre	

You discontinue his amiodarone.

Which of the following other treatments is the most appropriate treatment to control his thyrotoxicosis?

Your answer was correct

A	Radioiodine
B	Corticosteroids
C	Carbimazole
D	Potassium perchlorate
E	Thyroidectomy

Explanation

C Carbimazole

The picture seen here is very suggestive of amiodarone-induced thyrotoxicosis type 1, related to iodine excess and associated with more pronounced symptoms of thyroid disease, formation of a goitre and positive thyroid autoantibodies. Whilst changing the amiodarone to another appropriate anti-arrhythmic is a crucial first step in

C Carbimazole

The picture seen here is very suggestive of amiodarone-induced thyrotoxicosis type 1, related to iodine excess and associated with more pronounced symptoms of thyroid disease, formation of a goitre and positive thyroid autoantibodies. Whilst changing the amiodarone to another appropriate anti-arrhythmic is a crucial first step in therapy, the long half-life of amiodarone means that symptoms do not immediately improve and carbimazole is only usually effective at high dose.

A Radioiodine

This patient is likely to be iodine overloaded because of amiodarone dosing, and hence radioiodine is highly unlikely to be successful in managing the thyrotoxicosis.

B Corticosteroids

Corticosteroids are of value in controlling amiodarone-related thyroiditis, which is less likely to be the cause of thyroid disease here.

D Potassium perchlorate

Perchlorate is designed to gain acute control of thyrotoxicosis in patients with life-threatening symptoms before progressing to surgery.

E Thyroidectomy

Thyroidectomy is usually undertaken once thyroid function has been stabilised, because of the risks of progressing to surgery in patients with ongoing cardiovascular morbidity.

Question 19 of 128

A 35-year-old farm worker has been brought to the Emergency Department having attempted to kill himself by ingesting several mouthfuls of paraquat 2 h previously.

He is alert, and his main complaint is pain in his mouth and a retrosternal burning. His heart rate is 95 beats/min and his blood pressure is 135/70 mmHg. He has a respiratory rate of 18/min, with oxygen saturations reading 97% via a digital probe.

What is the most important step in his management?

A Application of high-flow oxygen via a tight-fitting face mask

B Confirm significant paraquat absorption via a urine test

C Measure plasma paraquat concentration

D Administer pralidoxime

E Administer atropine

B Confirm significant paraquat absorption via a urine test

Paraquat is a bipyridium herbicide used as a weedkiller, and if ingested can be incredibly toxic, affecting almost every organ system.

The qualitative urine test for paraquat is performed by adding 1 ml of urine to a solution of sodium dithionate and sodium hydroxide. If the solution turns blue, paraquat is present; a lighter green indicates diquat or low paraquat concentrations.

Local gastrointestinal irritation occurs initially, followed by hepatocellular dysfunction, kidney disease and chemical pneumonitis/acute respiratory distress syndrome. Perhaps the most well-known consequence of its ingestion is pulmonary fibrosis. This is thought to occur due to oxygen free radical damage, with initial destruction of type I and II alveolar cells and Clara cells, for which paraquat has a predilection, with an energy-dependent uptake via the polyamine pathway. Superoxide radicals are formed in the lungs in the presence of oxygen, which exacerbates lung damage, and therefore its application should be restricted unless absolutely necessary.

C Measure plasma paraquat concentration

If the urine test is positive then a plasma paraquat concentration is the next step. This will give an idea of prognosis and whether haemodialysis/haemoperfusion is warranted, although in practice a very small number of patients are likely to benefit.

A Application of high-flow oxygen via a tight-fitting face mask

Application of high-flow oxygen has no impact on prognosis with respect to pulmonary fibrosis.

Question 19 of 128

pulmonary fibrosis. This is thought to occur due to oxygen free radical damage, with initial destruction of type I and II alveolar cells and Clara cells, for which paraquat has a predilection, with an energy-dependent uptake via the polyamine pathway. Superoxide radicals are formed in the lungs in the presence of oxygen, which exacerbates lung damage, and therefore its application should be restricted unless absolutely necessary.

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A Application of high-flow oxygen via a tight-fitting face mask

Application of high-flow oxygen has no impact on prognosis with respect to pulmonary fibrosis.

D Administer pralidoxime

Pralidoxime is an initial step in the treatment of organophosphate poisoning and doesn't have a role in the treatment of paraquat overdose.

E Administer atropine

Atropine is the other step, apart from use of pralidoxime, in the treatment of organophosphate poisoning.

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Pralidoxime is an initial step in the treatment of organophosphate poisoning and doesn't have a role in the treatment of paraquat overdose.

E	Administer atropine

Atropine is the other step, apart from use of pralidoxime, in the treatment of organophosphate poisoning.

You attend a lecture where you view data on a new beta-receptor agonist for the treatment of asthma.

According to your understanding of agonism and antagonism, which of the following agents is best described as a non-competitive antagonist drug?

A Salmeterol

B Noradrenaline

C Prazosin

D Salbutamol

E Phenoxybenzamine

E Phenoxybenzamine

Phenoxybenzamine is a non-competitive α-adrenoreceptor antagonist, which cannot be displaced by endogenous α-receptor ligands. It is the most potent α-blocker available and is used in presurgical treatment of hypertension associated with phaeochromocytoma.

A Salmeterol

Salmeterol is an example of a partial beta agonist. It has a longer half-life than salbutamol and is therefore a component of preventer therapy in the treatment of asthma. When used to excess however it may blunt the effectiveness of salbutamol in the management of asthma exacerbations.

B Noradrenaline

Noradrenaline is a potent endogenous adrenoreceptor agonist, which accounts for its use as an inotropic agent.

C Prazosin

Prazosin is a competitive α-receptor antagonist and is commonly used as add-on therapy in the treatment of hypertension. It isn't used as a first line agent for phaeochromocytoma because of difficulties in obtaining full agonism.

D Salbutamol

Salbutamol is an example of an exogenous β_2-adrenoreceptor agonist. It is relatively short acting, which accounts for its use as a relieving agent in the treatment of asthma.

A 33-year-old woman has been admitted via the Emergency Department with an overdose of dothiepin. She is drowsy and confused with dilated pupils and hyperreflexia. Her blood pressure is 100/60 mmHg with a pulse of 95 bpm.

Whilst you examine her, you notice that the cardiac monitor shows intermittent runs of ventricular tachycardia and torsades. This coincides with more severe episodes of hypotension.

Result of arterial blood gas are:

pH	7.30
$p_a(O_2)$	13.2 kPa
$p_a(CO_2)$	4.8 kPa
Base excess	-4

The Emergency Department consultant has already begun a magnesium infusion.

Which of the following is the next most appropriate management step?

A	Charcoal haemoperfusion
B	IV sodium bicarbonate
C	Amiodarone infusion
D	Ammonium chloride
E	Metoprolol

A 25-year-old patient is referred to clinic with sleep disturbances. He describes attacks during the day when he would suddenly fall asleep and he has even suffered these episodes whilst walking. The patient has been getting hallucinations just before falling asleep and occasionally wakes up in the middle of the night unable to move. He has had no attacks in the day when he has consciously lost muscle tone.

On further questioning, he recalls his grandfather having similar problems. He is previously fit and well. Despite trying various methods to improve his sleeping timetable, he is still getting symptoms. Neurological examination is unremarkable.

What pharmacological therapy would best benefit this patient?

A	Temazepam
B	Methylphenidate
C	Clomipramine
D	Fluoxetine
E	Alcohol

6503

succession. It is not unusual for the gag reflex to be retained, as in the present scenario. Clinical diagnosis is confirmed on repetitive nerve stimulation test, which shows a progressive increase in amplitude of the potentials. Treatment is by the use of the trivalent antiserum and guanidine hydrochloride (although this is unproven in the clinical trial setting).

A	Guillain-Barré syndrome

This syndrome is associated with ascending paralysis rather than the central symptoms of muscle weakness appearing first, as is seen here. The Miller-Fisher variant does, however, present with central weakness first and, in this case, nerve conduction studies/EMG may be helpful (GBS showing conduction block, and botulism demonstrating abnormalities of neuromuscular transmission) and also CSF examination (which would show an elevated protein in GBS but would be normal in botulism).

B	Lambert-Eaton syndrome

Lambert-Eaton syndrome presents with gradual-onset muscle weakness over a number of weeks and is associated with underlying bronchial carcinoma.

C	Myasthenia gravis

This is associated with gradual-onset proximal myopathy and is associated with other underlying autoimmune conditions.

A 24-year-old woman who is 8 weeks' pregnant suffers two generalised tonic-clonic seizures on awakening. There is a family history of epilepsy. She has no other past medical history of note and following brain imaging and electroencephalogram (EEG), a diagnosis of idiopathic epilepsy is made. You are considering treatment with an anti-epileptic drug.

Which of the following would prove the most appropriate option for her?

A Topiramate

B Sodium valproate

C Lamotrigine

D Levetiracetam

E Sodium valproate/levetiracetam combination

18633

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Your answer was correct

A	Topiramate
B	Sodium valproate
C	Lamotrigine
D	Levetiracetam
E	Sodium valproate/levetiracetam combination

Explanation

C Lamotrigine

According to 2016 data across 69 pregnancies, the rate of

C Lamotrigine

According to 2016 data across 69 pregnancies, the rate of congenital malformation used at low dose is approximatel 2%. This puts it amongst the safest options for treatment c epilepsy in pregnancy.

A Topiramate

Across 17 reported pregnancies in 2016, rates of congenita malformation are estimated at between 4 and 7%.

B Sodium valproate

Rates for major congenital malformation for sodium valproate are as high as those seen for topiramate, at approximately 6%, across 74 pregnancies.

D Levetiracetam

Although low rates of congenital malformation are seen fo levetiracetam, exposure as reported for 2016 across only 11 pregnancies, this drives lamotrigine as the correct answer due to insufficient evidence for levetiracetam.

E Sodium valproate/levetiracetam combination

Combination therapy may have as a baseline the same risk as sodium valproate, or a potentially cumulative increased risk of malformations across the two compounds.

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C	Lamotrigine
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E	Sodium valproate/levetiracetam combination

A 52-year-old woman is brought in unconscious by ambulance. On admission to casualty, she has a Glasgow Coma Score (GCS) of 6. Her airway appears to be compromised. Her sister follows by car, and suggests the woman has taken a large overdose of temazepam tablets. She is known to use these on a regular basis and also takes amitriptyline.

Urea and electrolytes are unremarkable, but arterial blood gasses are suggestive of respiratory depression with both raised CO_2 and decreased O_2 levels.

What is the most appropriate management step?

Your answer was correct

A	Observation on a high-dependency unit
B	Anaesthetic review with consideration for intubation and ventilation
C	Repeat dose intravenous (iv) flumazenil
D	Repeat dose iv naloxone
E	Continuous flumazenil infusion

Explanation

B	Anaesthetic review with consideration for intubation and ventilation

In patients who are habituated to benzodiazepines and who also suffer overdose of tricyclic antidepressants, there

Explanation

B Anaesthetic review with consideration for intubation and ventilation

In patients who are habituated to benzodiazepines and who also suffer overdose of tricyclic antidepressants, there is a markedly increased risk of seizure activity if flumazenil is used to reverse the benzodiazepine component. As such, with a GCS of < 8, intubation and ventilation is recommended.

A Observation on a high-dependency unit

Given the GCS is < 8, airway protection is essential, therefore intubation and ventilation is preferred.

C Repeat dose intravenous (iv) flumazenil

This may cause only short-term improvement in conscious level, and also increase seizure risk.

D Repeat dose iv naloxone

Naloxone is used for reversal of opiate overdose.

E Continuous flumazenil infusion

Although this will reverse benzodiazepine overdose, it substantially increases the risk of seizures.

Question 42 of 128

A 32-year-old nursing student has been admitted to the Emergency Medical Unit having taken an impulsive overdose of paracetamol 5 h previously.

You have taken paracetamol levels, which indeed are above the treatment line, and have commenced N-acetyl cysteine (NAC) at the appropriate dose. A few minutes after the infusion begins, the patient complains of facial flushing and generalised pruritus. She has no orofacial swelling, and there is no evidence of airways compromise.

Which of the following is the most appropriate intervention?

A	Subcutaneous (sc) 1 mg adrenalin
B	Intramuscular (im) 5 mg adrenalin
C	Stop the infusion temporarily
D	Intravenous (iv) 200 mg hydrocortisone
E	Stop the infusion and switch to oral methionine

7569

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Explanation

C Stop the infusion temporarily

It is not uncommon for individuals prescribed N-acetyl cysteine (NAC) to suffer a mild anaphylactoid reaction. This may occur in 5% of cases, and can usually be treated by temporarily halting the infusion and giving an antihistamine

1:48

Question 42 of 128

C Stop the infusion temporarily

It is not uncommon for individuals prescribed N-acetyl cysteine (NAC) to suffer a mild anaphylactoid reaction. This may occur in 5% of cases, and can usually be treated by temporarily halting the infusion and giving an antihistamine if required. In most cases, the NAC can be recommenced at a slower infusion rate (usually 50 mg/kg over 4 h).

A Subcutaneous (sc) 1 mg adrenalin

Adrenalin is not required in this case as the anaphylactoid reaction is not severe. In any case, sc delivery drives unpredictable absorption. im delivery is usually warranted where adrenalin is required.

B Intramuscular (im) 5 mg adrenalin

Adrenalin im is warranted for patients with airway compromise. In this case, the symptoms will resolve rapidly once the NAC is temporarily discontinued.

D Intravenous (iv) 200 mg hydrocortisone

Adrenalin im is warranted for patients with airway compromise. In this case, the symptoms will resolve rapidly once the NAC is temporarily discontinued.

E Stop the infusion and switch to oral methionine

Patients often vomit after paracetamol overdose, particularly when they have also taken alcohol. This makes it difficult to achieve sufficient oral administration of methionine to be effective.

7569

Rate this question:

A 75-year-old widow has been sent in to the Emergency Department by her general practitioner. She has been becoming increasingly confused of late, and it has been noted on a number of occasions that she has been taking her medication incorrectly.

Her atrial fibrillation has been rate-controlled with digoxin for 5 years, but on admission she has a heart rate of 34 beats/min and a systolic blood pressure of 90 mmHg. You suspect that she is digitoxic. Potassium is measured at 4.2 mmol/l on the blood gas analyser.

Which one of the following treatments would be of most benefit?

A	Atropine
B	Adenosine
C	Naloxone
D	Flumazenil
E	Methionine

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Your answer was correct

A Atropine

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Explanation

A Atropine

Digoxin is a cardiac glycoside used in the treatment of atrial fibrillation to control the ventricular rate, and in the

A Atropine

Digoxin is a cardiac glycoside used in the treatment of atrial fibrillation to control the ventricular rate, and in the treatment of heart failure as it is positively inotropic. It acts by blocking the sodium/potassium ATPase pump, and toxicity may lead to bradycardia, atrioventricular blockade and ventricular tachycardia. Treatment consists of withdrawing its use, and treating any underlying metabolic or electrolyte disturbance, particularly hypokalaemia. Atropine and cardiac pacing may increase the ventricular rate, and toxicity may be treated via the administration of digoxin-specific antibody fragments (Digibind). Note that hypokalaemia may predispose to digitalis toxicity at therapeutic doses, and so if a patient is digitoxic and hypokalaemic, then this should also be corrected.

B Adenosine

Adenosine is used to induce transient AV block in patients with paroxysmal SVT to drive potential cardioversion.

C Naloxone

Naloxone is used as a reversal agent in opiate overdose, and has no role to play in the treatment of digoxin overdose.

D Flumazenil

Flumazenil is used as a reversal agent for acute benzodiazepine overdose. It isn't recommended for reversal of overdose in chronic users of benzodiazepines

Naloxone is used as a reversal agent in opiate overdose, and has no role to play in the treatment of digoxin overdose.

D Flumazenil

Flumazenil is used as a reversal agent for acute benzodiazepine overdose. It isn't recommended for reversal of overdose in chronic users of benzodiazepines because of the risk of inducing seizures.

E Methionine

Methionine is delivered orally and can be used to treat paracetamol overdose where N-acetylcysteine isn't tolerated.

A 32-year-old man with a history of HIV diagnosed some two years ago is admitted to the Emergency Department, with abdominal pain and a small increase in his serum creatinine.

He has apparently recently had an alteration made to his anti-retroviral medication. Abdominal examination reveals significant left loin pain consistent with renal colic.

Which of the following medications is recognised to cause the clinical picture seen here?

A Abacavir

B Efavirenz

C Nevirapine

D Nelfinavir

E Stavudine

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A Abacavir

B Efavirenz

C Nevirapine

D Nelfinavir

E Stavudine

Explanation

D Nelfinavir

Although nephrolithiasis is rare with modern protease inhibitors, it is still reported in some patients taking nelfinavir. In contrast to indinavir, which is approximately 20% excreted into the urine, excretion of nelfinavir into urine is less than 3%.

C Nevirapine

Nevirapine is most commonly associated with rash and hepatitis, but not with adverse renal effects.

A Abacavir

Abacavir [illegible]ciated with acute interstitial nephritis, ass[illegible] eosinophilia, blood and proteinuria.

Explanation

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C **Nevirapine**

Nevirapine is most commonly associated with rash and hepatitis, but not with adverse renal effects.

A **Abacavir**

Abacavir is associated with acute interstitial nephritis, associated with eosinophilia, blood and proteinuria.

B **Efavirenz**

Efavirenz is not thought to be associated with significant adverse renal effects; it is commonly associated with hypertriglyceridaemia.

E **Stavudine**

Stavudine is associated with proximal renal tubular dysfunction rather than the nephrolithiasis picture seen here.

A 68-year-old man, drowsy and confused, is brought in to hospital during the night by his carer. He accidentally overdosed on his medication from his dosette box approximately 6 h ago. He has a background of Alzheimer's disease, hypertension, angina and glaucoma. From the dosette box card the patient's medication include temazepam, atenolol and bendrofluazide. Pulse 35 bpm, blood pressure 85/45 mmHg, respiratory rate 14/min, oxygen saturation 98%. There is no pulse response to 2 mg of atropine.

Initial investigations:

Blood gases on air:

pH	7.41
$p_a(O_2)$	9.8 kPa
$p_a(CO_2)$	4.9 kPa

Na^+	139 mmol/l
K^+	4.3 mmol/l
Urea	5.8 mmol/l
Creatinine	61 µmol/l
Bicarbonate	23 mmol/l
Glucose	2.1 mmol/l
Electrocardiogram	Sinus bradycardia 35 bpm

He is given intravenous dextrose; which of the following is the appropriate next intervention?

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A	Flumazenil
B	Haemodialysis
C	Activated charcoal
D	Glucagon
E	Atropine

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Your answer was correct

A	Flumazenil
B	Haemodialysis
C	Activated charcoal
D	Glucagon
E	Atropine

Explanation

D Glucagon

This man is most likely to have taken an overdose of β-blockers, for which repeated doses of glucagon are known to reverse hypotension and bradycardia; this is thought to be via a β receptor independent effect on cAMP levels and myocardial contractility. It will also help drive correction of his hypoglycaemia.

Explanation

D **Glucagon**

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A **Flumazenil**

Flumazenil competitively inhibits the action of benzodiazepines. It is useful in reversal of their effect on the central nervous system, but can increase the risk of seizures. This patient does not have respiratory compromise and is at risk of seizures due to hypoglycaemia; as such flumazenil would not be recommended here.

B **Haemodialysis**

Atenolol overdose can be treated with haemodialysis, particularly when excretion of atenolol is reduced, for example where there is pre-existing chronic renal impairment.

C **Activated charcoal**

Activated charcoal does not have a role here as all of the atenolol dosed is already likely to have been absorbed.

E **Atropine**

Bradycardia associated with β-blocker overdose responds

A 70-year-old retired pharmacist is brought in by ambulance having ingested a massive quantity of atenolol tablets. His wife has recently died, and he had made it clear to his close friends that he would rather die than be left alone.

He has a Glasgow Coma Scale (GCS) score of 14/15, with confused conversation, a bradycardia of 30 beats/min and a systolic blood pressure of 85 mmHg. His blood glucose on finger-prick testing is 2.9 mmol/l.

What antidote would be of use in this scenario?

A	Naloxone
B	Methylene blue
C	Glucagon
D	Dicobalt edetate
E	Pralidoxime

Beta-blockers taken in overdose predictably can cause bradycardia and hypotension, as well as a decreased level of consciousness, seizures and hypoglycaemia. Glucagon can be used as an antidote, and works by increasing myocardial cAMP levels independently of the beta-receptor. This has beneficial inotropic and chronotropic effects.

A Naloxone

Naloxone is the reversal agent for opiates and is therefore not of value here.

B Methylene blue

This is titrated as a reversal agent in methaemoglobinaemia, which may be seen as a result of overdose of amyl nitrate and other potential oxidising agents.

D Dicobalt edetate

This is an agent used in the treatment of cyanide poisoning where, given as early as possible, it reduces tissue binding of cyanide.

E Pralidoxime

Pralidoxime acts by reactivating acetylcholinesterase in poisoning from organophosphate insecticides and nerve agents.

A 45-year-old bartender is admitted with a febrile illness and productive cough of one week's duration. X-ray of the chest revealed right-sided basal pneumonia and he was started on cephalosporin. On the third day, he was found to have repeated vomiting, following which he became confused.

On examination, temperature was 39 °C, pulse 120/min and blood pressure 130/80 mmHg. He was uncooperative and was plucking at his clothes and pointed in several directions as if he were seeing objects that were not present. He was tremulous and his ankle jerks were absent.

The patient was given chlordiazepoxide by the medical registrar for alcohol withdrawal. The next day, he became drowsy and unsteady. The consultant physician saw him and found that extra-ocular movements were restricted on lateral gaze, and a horizontal nystagmus was elicited. He was disoriented and confused and had gait ataxia. The consultant physician considered a new diagnosis.

What is the most likely diagnosis?

A	Benzodiazepine toxicity
B	Encephalitis
C	Wernicke's encephalopathy
D	Central pontine myelinolysis
E	Brain stem infarction

C Wernicke's encephalopathy

Alcohol abuse is common in persons who have easy access to it, as shown by high rates among those employed in the alcohol trade, among other factors such as cultural and genetic ones. The patient depicted above has features of delirium tremens initially. Laboratory parameters that are useful in confirming alcohol abuse in individual cases are the mean corpuscular volume gamma-glutamyl transferase, both of which are raised in problem drinkers. The patient then developed features of Wernicke's encephalopathy. This often has an abrupt onset with drowsiness, disorientation and an impaired ability to register and recall recent events. Physical examination reveals horizontal nystagmus, evidence of external ocular palsies, ataxia and peripheral neuropathy. Poor nutrition, associated with chronic alcoholism, prolonged vomiting, diarrhoea and severe starvation, are predisposing causes for thiamine deficiency, the cause. Immediate treatment with IV thiamine 50 mg is essential to minimise permanent damage and, given his profession, it might have been prudent to suspect impending Wernicke's and have started empirical treatment earlier.

A Benzodiazepine toxicity

Benzodiazepine toxicity should not be associated with the gaze palsy seen here, and administration of agents such as chlordiazepoxide is crucial to avoid significant morbidity and mortality associated with delirium tremens.

B Encephalitis

Encephalitis is more likely to be associated with memory loss rather than with the specific gaze palsy seen here

D Central pontine myelinolysis

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B Encephalitis

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D Central pontine myelinolysis

Central pontine myelinolysis is associated with rapid correction of hyponatraemia and is associated with muscle paralysis.

E Brain stem infarction

We're given no indication of vascular risk factors, and a specific gaze palsy without other features of posterior territory infarction would be very unusual.

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A 74-year-old man is admitted with urinary retention and symptoms of a urinary tract infection (UTI) to the Elderly Care Ward. He is commenced on intravenous (iv) co-amoxiclav, but remains confused on his second night in hospital. You are asked to review him with respect to intervening in his confusion.

On examination his blood pressure (BP) is 141/70 mmHg, pulse is 82 bpm and he is pyrexial - 37.8 °C. He is agitated and confused, telling you that the nurses are out to get him and trying to leave the ward.

Investigations:

Haemoglobin (Hb)	12.5 g/dl
White cell count (WCC)	14.4 × 10^9/l
Platelets (PLT)	301 × 10^9/l
Sodium (Na^+)	136 mmol/l
Potassium (K^+)	4.4 mmol/l
Creatinine (Cr)	149 µmol/l

Which of the following is the most appropriate initial step in managing him?

A	Haloperidol
B	Lorazepam
C	Olanzapine
D	Risperidone

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D	Risperidone
E	1:1 nursing in a safe environment

E 1:1 nursing in a safe environment

Nursing in a well-lit room, with a named nurse (one specifically allotted to the patient) who takes time to explain what is happening to the patient, controlled noise and room temperature are all important initial steps in the management of delirium. This should pre-date pharmacological interventions.

A Haloperidol

Haloperidol is a recommended initial pharmacological intervention for the treatment of delirium, although changes in the nursing environment should form the initial basis for intervention.

B Lorazepam

Lorazepam is an initial pharmacological intervention for the treatment of delirium, particularly where there is a history of movement disorder, although, like haloperidol, it should be reserved for patients who fail to respond to changes in the environment alone.

C Olanzapine

Atypical antipsychotic agents are generally considered a second- or third-line option for the treatment of delirium in the elderly, because of concerns about their cardiovascular risk profile.

D Risperidone

Risperidone is only really considered in the event that patients fail to respond to treatment with haloperidol or lorazepam, or these agents are unsuitable or

A 45-year-old man with hypertension and dyslipidaemia is diagnosed with early type 2 diabetes and commenced on glitazone therapy. He has suffered from psoriasis for many years, which has been resistant to treatment and his dermatologist elects to commence ciclosporin therapy.

He is warned about the potential for drug interactions with ciclosporin and told to carry a card, but you warn him about a few of the common interactions he should be concerned about.

Which of the following drugs or foods should he be most concerned about with respect to increasing his ciclosporin levels?

A Orange juice

B Verapamil

C Amoxicillin

D Cranberry juice

E Rifampicin

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Your answer was incorrect

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B Verapamil

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Explanation

B Verapamil

Verapamil is a CYP 450 enzyme inhibitor which leads to a potentially significant elevation in levels of cyclosporine. As such, if possible an alternative agent should be substituted.

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A Orange juice

Grapefruit, not orange juice, is an inhibitor of CYP3A4 and can therefore drive an increase in ciclosporin levels. Examples of other agents that increase ciclosporin levels include antifungals, diltiazem, nicardipine, metoclopramide, oral contraceptives, danazol, methylprednisolone (high dose), allopurinol, amiodarone, ursodeoxycholic acid and protease inhibitors.

C Amoxicillin

Macrolides are inhibitors of CYP3A4 and lead to an increase in ciclosporin levels, but penicillins do not.

D Cranberry juice

Cranberry juice is an inhibitor of CYP 2C9, leading to an increase in exposure to warfarin.

E Rifampicin

Rifampicin is a potent CYP450 inducer, leading to a decrease in ciclosporin levels. Other agents known to decrease ciclosporin levels include barbiturates, carbamazepine and phenytoin, octreotide, orlistat and *Hypericum perforatum* (St John's wort).

Question 45 of 83

A 71-year-old woman presents to the Ear, Nose and Throat (ENT) Clinic with sensorineural deafness.

You are examining her medication history. This includes use of aciclovir, amoxicillin, co-amoxiclav, oral furosemide and intravenous (iv) erythromycin for a serious lower respiratory tract infection a few years ago, where she was admitted to the Intensive Care Unit (ICU) for a period of time.

Which of these agents would fall under suspicion as a possible contributory cause?

A	iv aciclovir
B	iv ciprofloxacin
C	iv co-amoxiclav
D	iv erythromycin
E	Oral furosemide

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Question 45 of 83

D iv erythromycin

Like iv gentamycin and iv vancomycin, iv erythromycin is recognised as a rare cause of sensorineural hearing loss. This is likely to be related to overly rapid administration, with loss of hearing linked to the c_{max} of the drug. It has now largely been replaced by oral clarithromycin; absorption of macrolides is such that iv administration is rarely warranted in the conscious patient.

E Oral furosemide

Although iv furosemide is recognised as a cause of sensorineural deafness, particularly in the ITU setting; oral furosemide is not thought to lead to significant hearing loss.

A iv aciclovir

Aciclovir is recognised to cause dizziness and headache, although it does not lead to hearing loss.

B iv ciprofloxacin

The main concern with respect to quinolone use is increased risk of tendon rupture and P450 interaction potential.

C iv co-amoxiclav

Co-amoxiclav is recognised to increase the risk of obstructive jaundice, particularly when used for a period of more than 2 weeks.

Rate this question:

A 62-year-old man returns to the Emergency Ward with confusion some two weeks after discharge post-anterior myocardial infarction.

He made a relatively good recovery and was started on a range of medications, including an antidepressant, as he said he was feeling really very depressed after his myocardial infarction. He did have depression which required medication a few years earlier, and felt that his old symptoms were returning. His wife tells you that he has become increasingly vague over the past three to four days.

On examination, his blood pressure (BP) is 125/75 mmHg, his pulse is 78/min and regular. He is euvolaemic.

Investigations:

Hb	13.1 g/dl
WCC	6.1 × 10^9/l
PLT	201 × 10^9/l
Na^+	127 mmol/l
K^+	4.9 mmol/l
Creatinine	110 µmol/l

Which of the following agents is most likely to be responsible for his low sodium?

A	Ramipril
B	Atenolol
C	Spironolactone
D	Citalopram

myocardial infarction.

He made a relatively good recovery and was started on a range of medications, including an antidepressant, as he said he was feeling really very depressed after his myocardial infarction. He did have depression which required medication a few years earlier, and felt that his old symptoms were returning. His wife tells you that he has become increasingly vague over the past three to four days.

On examination, his blood pressure (BP) is 125/75 mmHg, his pulse is 78/min and regular. He is euvolaemic.

Investigations:

Hb	13.1 g/dl
WCC	6.1 × 10^9/l
PLT	201 × 10^9/l
Na^+	127 mmol/l
K^+	4.9 mmol/l
Creatinine	110 μmol/l

Which of the following agents is most likely to be responsible for his low sodium?

A Ramipril

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D Citalopram

E Furosemide

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D Citalopram

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Explanation

D Citalopram

He has been started on citalopram for his depression, and like other CNS-active agents, citalopram may cause syndrome of inappropriate ADH. Presentation with SIADH is unpredictable and may occur some time after starting

D Citalopram

He has been started on citalopram for his depression, and like other CNS-active agents, citalopram may cause syndrome of inappropriate ADH. Presentation with SIADH is unpredictable and may occur some time after starting therapy. Other CNS drug causes include carbamazepine, tricyclic antidepressants, thioridazine and nicotine. Management in this case would involve discontinuation of the citalopram and offering psychotherapy as an alternative, bearing in mind that other SSRIs and tricyclics may also cause SIADH. If citalopram is continued then fluid restriction is unlikely to be effective.

Evidence on the relative increase in risk of SIADH for a range of antidepressants comes from a Danish registry study. Confidence intervals for risk increase are: citalopram 7.8 (CI 7.42-8.20); clomipramine 4.93 (CI 2.72-8.94); duloxetine 2.05 (CI 1.44-292); venlafaxine 2.90 (CI 2.43-3.46); mirtazapine 2.95 (CI 2.71-3.21); and mianserin 0.90 (CI 0.71-1.14).

A Ramipril

Ramipril is not associated with SIADH; the main concern with respect to ACE inhibitor use is hyperkalaemia.

B Atenolol

Atenolol is not associated with hyponatraemia.

C Spironolactone

Spironolactone is used at low dose in the treatment of heart failure, and is therefore less likely to cause hyponatraemia.

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E Furosemide

Furosemide promotes both salt and water excretion, and it is therefore rarely associated with hyponatraemia in a patient who appears euvolaemic. Hyponatraemia is seen more commonly in patients taking loop diuretics combined with a thiazide, or where there is marked fluid overload.

21287

A 52-year-old man is diagnosed with Parkinson's disease. He has recently started a second family with a new partner and is worried about dyskinesias associated with levodopa and complications of lung fibrosis that he has heard about with other drugs.

Which of the following agents would you recommend?

A Ropinirole

B Levodopa

C Amantadine

D Cabergoline

E Apomorphine

20628

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Your answer was correct

A Ropinirole

B Levodopa

C Amantadine

D Cabergoline

E Apomorphine

Explanation

A Ropinirole

Ropinirole is a non-ergot-derived dopamine agonist licensed for the treatment of Parkinson's disease and, most recently, for restless legs syndrome. Dopamine agonists may be associated with less on/off phenomena than L-dopa-based therapies, although they don't impact on long-term prognosis versus L-dopa. This reduced fluctuation in motor function is potentially more suitable for a patient with a young family.

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B Levodopa

This may be associated with greater dyskinesia versus ropinirole, driving this as the second-choice agent in this patient.

C Amantadine

Amantadine only has mild anti-parkinsonian effects and is less effective versus both L-dopa and ropinirole. As such it isn't the first-choice therapy here.

D Cabergoline

Cabergoline is an ergot-derived dopamine agonist which is associated with increased risk of fibrotic disease.

E Apomorphine

Apomorphine is delivered by subcutaneous pump. It is effective in advanced Parkinson's, but the mode of delivery means it isn't usually used early on in the time course of the disease.

A 22-year-old woman is admitted with a paracetamol overdose. She has a background history of depression and is on a selective serotonin reuptake inhibitor (SSRI). Her friends and family are concerned she may have taken other medications beside paracetamol, as she had stockpiled at least three months' supply of her citalopram.

Which of the following findings might you find if the patient had overdosed on an SSRI?

A Hyperreflexia

B Upgoing plantars

C Miosis

D Bradykinesia

E Apraxia

32798

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Which of the following findings might you find if the patient had overdosed on an SSRI?

Your answer was correct

A Hyperreflexia

B Upgoing plantars

C Miosis

D Bradykinesia

E Apraxia

Explanation

A Hyperreflexia

Overdose of SSRIs can cause the serotonin syndrome, although toxicity is rarely seen unless a massive overdose of SSRI is taken. Examples of symptoms of toxicity include restlessness, hallucinations and sweating. Signs include hyperthermia, hyperreflexia, myoclonus, ataxia, mydriasis and tachycardia. Management of SSRI overdose is supportive, with benzodiazepines the drug of choice to

Explanation

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B Upgoing plantars

Upgoing plantars are seen in the serotonin syndrome and in neuroleptic malignant syndrome, although they are less likely to be present than hyperreflexia.

C Miosis

Mydriasis, not miosis, is seen in patients with the serotonin syndrome/where there is an SSRI overdose.

D Bradykinesia

Bradykinesia is a feature of the neuroleptic malignant syndrome.

E Apraxia

Apraxia is not commonly seen in association with SSRI overdose, but is seen in offspring of mothers treated with SSRIs.

Question 49 of 83

A 28-year-old woman is admitted to the Emergency department in an unconscious state. She was found by her boyfriend, who informs you that they had a row that evening. He found an empty bottle of amitriptyline 75 mg tablets next to her. Apparently, the prescription had been filled three days earlier at the pharmacy.

On examination, she has a Glasgow Coma Scale (GCS) score of 6 and her blood pressure (BP) is 90/50 mmHg. Her pulse is weak and rapid and you glance at the electrocardiogram (ECG) monitor, which shows that she is in ventricular tachycardia.

Investigations:

Haemoglobin (Hb)	13.0 g/dl
White cell count (WCC)	5.0 × 10^9/l
Platelets (PLT)	25 × 10^9/l
Sodium (Na^+)	138 mmol/l
Potassium (K^+)	4.8 mmol/l
Creatinine (Cr)	110 µmol/l
pH	7.28
pO_2	8.0 kPa
pCO_2	5.4 kPa

Which of the following represents the most appropriate agent to manage her ventricular tachycardia (VT) (bicarbonate has already been administered)?

A	Bretylium
B	Amiodarone

Rana Alnasser's screen

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A	Bretylium
B	Amiodarone
C	Quinidine
D	Procainamide
E	Lignocaine

Question 49 of 83

E Lignocaine

Lignocaine increases the electrical stimulation threshold of the ventricle, suppressing automaticity of conduction and terminating ventricular tachycardia. It is usually given as a bolus followed by a continuous infusion at lower dose. In contrast to the other agents, it does not lengthen the QT interval further and is therefore the optimal intervention in patients who fail to gain rhythm control with bicarbonate alone.

A Bretylium

Bretylium works by inhibiting voltage-gated potassium channels, and leads to QT prolongation; as such, it isn't an optimal intervention here.

B Amiodarone

Like the other incorrect options, amiodarone prolongs the action potential. It is thought to work by inhibiting sodium/potassium-activated myocardial ATP.

C Quinidine

Quinidine blocks the fast inward sodium channel, and therefore increases the duration of the action potential. It increases the risk of VT in this situation.

D Procainamide

The mode of action of procainamide is similar to quinidine; as such, it isn't an appropriate intervention here because it increases the duration of the action potential.

A 59-year-old man, who has spent a long period of time on the ITU after MRSA septicaemia, a myocardial infarction and subsequent left ventricular failure, attends the clinic for follow-up. He complains of dizziness and tinnitus; he says the dizziness is worse if he goes out at night or he turns his head quickly.

On examination, you can reproduce his dizziness on rapid movements of the head. The remainder of the clinical examination is unremarkable.

Which of the following is the most likely cause of his symptoms?

A	Vancomycin toxicity
B	Furosemide toxicity
C	Vestibular stroke
D	Aspirin toxicity
E	Vestibular neuronitis

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E	Vestibular neuronitis

Explanation

A Vancomycin toxicity

Vancomycin may be used as part of the treatment regime for MRSA. Given that this man has spent a considerable amount of time on the intensive therapy unit, it is likely that he has been treated with vancomycin. Several reports of

Question 50 of 83

A Vancomycin toxicity

Vancomycin may be used as part of the treatment regime for MRSA. Given that this man has spent a considerable amount of time on the intensive therapy unit, it is likely that he has been treated with vancomycin. Several reports of toxicity exist, which is manifest primarily as tinnitus, but other vestibular symptoms may be reported, including dizziness. Adequate testing of vancomycin levels, aiming to maintain them within the target range, is crucial to avoid toxicity

B Furosemide toxicity

Furosemide toxicity is more commonly associated with hearing loss as the primary symptom and is very rarely seen as a result of awareness of the need for slow IV administration.

C Vestibular stroke

A vestibular stroke without other neurological signs would be highly unlikely.

D Aspirin toxicity

Aspirin toxicity is associated with acute tinnitus in the first few hours after overdose, not with chronic vestibular dysfunction of the type seen here.

E Vestibular neuronitis

Given the history of exposure to vancomycin, this is much more likely to be the underlying cause of symptoms than viral neuronitis.

A 26-year-old man with a history of psoriasis returns from a 3-week holiday to India with rapidly worsening psoriasis. He took antimalarials and antibiotics with him. His condition is normally mild and managed with topical therapies only.

On examination, he has widespread psoriasis, which is contiguous in many areas.

Which of the following is the most likely causative agent?

A	Ciprofloxacin
B	Metronidazole
C	Chloroquine
D	Amoxicillin
E	Oxytetracycline

21013

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Explanation

C Chloroquine

Whilst it is difficult to establish the link between

C Chloroquine

Whilst it is difficult to establish the link between antimalarials and psoriasis from clinical trials, case reports of psoriasis associated with antimalarial therapy have stimulated original discussion about drug-induced psoriasis. One paper from 1997 postulated that the effect of antimalarials on trans-glutaminase activity leads to stimulation of epidermal proliferation, and thus chloroquine is the appropriate answer here.

A Ciprofloxacin

Quinolones are not recognised as a cause of worsening psoriasis - they are associated with tendonopathy, which precludes their use in pregnant women.

B Metronidazole

Metronidazole is not a cause of psoriasis but is linked to the development of pustular skin rashes.

D Amoxicillin

Penicillins are not associated with increased risk of psoriasis, but are associated with pruritis and urticaria.

E Oxytetracycline

Although oxytetracycline may increase the risk of psoriasis, the impact on risk is not thought to be as great as that seen for antimalarials.

21013

A 48-year-old man who was previously seen in the clinic for abdominal obesity, hypertension and dyslipidaemia presents six months later for review after having lost 42 lbs in weight.

On examination in the clinic, his blood pressure (BP) is 155/92 mmHg and his body mass index (BMI) is 28.

Investigations:

Hb	13.9 g/dl
WCC	5.9×10^9/l
PLT	230×10^9/l
Na^+	139 mmol/l
K^+	4×10^9/l
Creatinine	100 micromol/l
LDL	4.4 mmol/l
TG	3.5 mmol/l
HDL	0.7 mmol/l
Fasting glucose	6.8 mmol/l (< 6.1)

Which of the following is true in this case?

A	His cardiovascular risk is not increased
B	He does not require anti-hypertensive therapy
C	It would be reasonable to treat him with a statin
D	He should be considered for gastric reduction surgery

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B He does not require anti-hypertensive therapy

C It would be reasonable to treat him with a statin

D He should be considered for gastric reduction surgery

E He is not at increased risk of development of diabetes

C It would be reasonable to treat him with a statin

Of particular concern in this patient is the typical lipid pattern seen in insulin-resistant states, with low HDL cholesterol and high triglycerides. Given his increased lifetime risk of cardiovascular disease, it would therefore be sensible to treat him with a statin.

A His cardiovascular risk is not increased

This patient has signs of insulin resistance, and a low HDL which drives a raised LDL : HDL ratio; as such, cardiovascular risk is increased in this patient.

B He does not require anti-hypertensive therapy

A blood pressure (BP) of 155/92 in a patient with signs of insulin resistance means that intervention with anti-hypertensive therapy is warranted.

D He should be considered for gastric reduction surgery

This patient has already lost a significant amount of weight. As such, gastric reduction surgery isn't warranted.

E He is not at increased risk of development of diabetes

A fasting glucose of 6.8 is on the cusp of diabetes, meaning that conversion is likely over the next few years.

Question 53 of 83

A 24-year-old homeless man, well known to the Accident and Emergency Department, is admitted by ambulance after having a convulsive seizure in the street.

On examination, he is post-ictal and cannot be woken up. His BP is 95/60 mmHg, pulse is 90 and regular. You arrange a toxicology screen that demonstrates ethylene glycol levels of 8.2 mmol/l. He also has a metabolic acidosis with a pH of 7.15 and bicarbonate levels of 10 mmol/l. A bag of N saline to run over 1 h is commenced.

Which of the following is the most important next intervention for him?

A Methanol infusion

B IV 8.4% sodium bicarbonate

C IV furosemide

D IV disulfiram

E IV N-acetylcysteine

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Explanation

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Ethylene glycol toxicity is caused by its metabolites. The compound is metabolised by alcohol dehydrogenase; as such, competitive inhibition of alcohol dehydrogenase via

B IV 8.4% sodium bicarbonate

Ethylene glycol toxicity is caused by its metabolites. The compound is metabolised by alcohol dehydrogenase; as such, competitive inhibition of alcohol dehydrogenase via ethanol infusion or using 4-methylpyrazole (fomepizole) represents the most appropriate treatment. 4-Methylpyrazole may be preferable where it is available, as it does not cause intoxication. Where pH is <7.2, correction with IV sodium bicarbonate is recommended.

A Methanol infusion

Methanol is metabolised to formic acid, which in itself is toxic, leading to metabolic acidosis and optic atrophy.

C IV furosemide

In this case aggressive fluid replacement, rather than diuresis, is the intervention of choice.

D IV disulfiram

Disulfiram inhibits aldehyde dehydrogenase, and is used as an adjunct to behavioural therapy in the treatment of chronic alcoholism.

E IV N-acetylcysteine

N-acetylcysteine etylecysteine is used in the treatment of paracetamol overdose, and in the treatment of hepatic encephalopathy.

A 36-year-old woman is admitted to the Emergency Department having taken a combined overdose of amitriptyline, diazepam and codeine phosphate. She is known to the department with multiple previous admissions due to alcohol intoxication, and left a suicide note after a recent split from her partner.

On examination, her BP is 100/60 mmHg, with pulse 95/min and regular. GCS is 7. ECG reveals a QRS of 90 ms. Arterial blood gas reveals a pH of 7.29.

Which of the following is the most appropriate next step in her management?

A	IV sodium bicarbonate
B	IV flumazenil
C	Intubation and ventilation
D	IV naloxone
E	IV normal saline

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E IV normal saline

Explanation

C Intubation and ventilation

With a GCS of 7, which may fall further as the overdose continues to take effect, there is significant risk of airway compromise. Reversal agents may actually increase agitation or raise the risk of seizures, and should therefore be avoided here.

A IV sodium bicarbonate

C	Intubation and ventilation

With a GCS of 7, which may fall further as the overdose continues to take effect, there is significant risk of airway compromise. Reversal agents may actually increase agitation or raise the risk of seizures, and should therefore be avoided here.

A	IV sodium bicarbonate

IV sodium bicarbonate is indicated for QRS prolongation (>100 ms) and for significant acidosis.

B	IV flumazenil

In patients who are habitual users of benzodiazepines, particularly in conjunction with tricyclic antidepressants, reversal should be avoided because it can significantly increase the risk of seizures.

D	IV naloxone

Naloxone is short-acting, and therefore boluses have a limited impact on improving consciousness. It can be given as an infusion, but given the mixed nature of the overdose here, intubation and ventilation is the better option.

E	IV normal saline

Although fluid resuscitation is important, airway protection is the most important next step.

A 53-year-old civil servant has been referred to the medical team having suffered sudden onset of lip swelling. She is known to have hypertension, and her general practitioner has recently made a medication change for this.

On examination, she has swelling of her lips and tongue, but fortunately no evidence of airways compromise.

What is the most likely pharmacological culprit?

A	Metoprolol
B	Chlorthalidone
C	Ramipril
D	Doxazosin
E	Amlodipine

71085

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Explanation

C Ramipril

Angiotensin-converting enzyme (ACE) inhibitors, like most drugs, have many side effects/adverse drug reactions. One well-recognised adverse effect is angioedema, with swelling of the lips and tongue, and this reaction may occur with variable delay after commencing the drug. It is thought to be related to inhibition of bradykinin metabolism and increased levels of substance P.

C Ramipril

Angiotensin-converting enzyme (ACE) inhibitors, like most drugs, have many side effects/adverse drug reactions. One well-recognised adverse effect is angioedema, with swelling of the lips and tongue, and this reaction may occur with variable delay after commencing the drug. It is thought to be related to inhibition of bradykinin metabolism and increased levels of substance P. Epidemiological data suggest an incidence of up to 0.7% in patients taking ACE inhibitors, and that the risk is 10 times higher in African Americans.

A Metoprolol

Although metoprolol may be associated with the development of angioedema, the incidence with hypertensives other than ACE inhibitors is approximately 10-fold lower.

B Chlorthalidone

Angioedema occurred in 0,05% of elderly patients prescribed chlorthalidone in the ALLHAT study versus 0.41% of patients allocated to lisinopril.

D Doxazosin

Data from ALLHAT also support low rates of angioedema in patients prescribed alpha blockers, running at 0.06%.

E Amlodipine

Although case reports exist which support a role for amlodipine in causing angioedema, rates were low at [illegible] amlodipine as part of the

A 71-year-old woman presents to the Emergency Department some six days after being commenced on ciprofloxacin 500 mg BD for an MRSA-positive injection site abscess. Although she felt there was some initial improvement in erythema, over the past day the area of infection appears to have grown again and she feels feverish.

Examination reveals a temperature of 37.8 °C, BP is 132/80 mmHg and pulse is 80/min and regular.

Which of the following is the most likely cause of the worsening of symptoms?

A Co-infection with other bacteria

B Evolving resistance to ciprofloxacin

C Inadequate ciprofloxacin dose

D Inadequate tissue penetration

E Inadequate treatment duration

70596

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Explanation

B Evolving resistance to ciprofloxacin

Use of fluoroquinolones to treat skin and soft tissue MRSA infections is not recommended. This is because of widespread resistance, and evolving resistance during

B Evolving resistance to ciprofloxacin

Use of fluoroquinolones to treat skin and soft tissue MRSA infections is not recommended. This is because of widespread resistance, and evolving resistance during therapy on an individual patient basis which has been described for the class. Even quinolones with enhanced anti-staphylococcal activity, such as levofloxacin, are not recommended.

A Co-infection with other bacteria

This is highly unlikely given that no other growth is reported in the scenario.

C Inadequate ciprofloxacin dose

500 mg BD is the usual high dose delivered orally for ciprofloxacin, and the drug has an absolute bioavailability of approximately 70-80%.

D Inadequate tissue penetration

Ciprofloxacin has good tissue penetration, where in areas of inflammation/infection, tissue concentrations higher than those measured in plasma are usually recorded.

E Inadequate treatment duration

Given that her symptoms are worsening despite 6 days of antibiotics, inadequate treatment duration is incorrect.

A 39-year-old woman with a history of manic-depressive disorder visits her general practitioner (GP) for review. She is currently treated with lithium therapy.

The GP has been monitoring her blood pressure for the last few months; it is 155/105 mmHg in the clinic and he is keen to commence pharmacotherapy.

Which of the following antihypertensives carries least risk when co-prescribed with lithium?

A Bendroflumethiazide
B Acetazolamide
C Amlodipine
D Enalapril
E Valsartan

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Explanation

C Amlodipine

Diuretics, ARBs and ACE inhibitors lead to an increase in lithium concentration. Although the calcium channel antagonist class that includes amlodipine may lead to a syndrome of ataxia, confusion and sleepiness, this is uncommon, meaning that the balance of risk-benefit is positive in favour of amlodipine versus the other options

C Amlodipine

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A Bendroflumethiazide

Thiazide diuretics lead to paradoxical salt and water retention and are a recognised cause of lithium intoxication.

B Acetazolamide

Acetazolamide, like other carbonic anhydrase inhibitors, can drive increased lithium excretion, actually leading to increased symptoms of bipolar disorder.

D Enalapril

ACE inhibitors are recognised to decrease GFR on initiation, although over time they retard progression of renal disease. This is associated with a 7-fold increase in admission for lithium toxicity where they are co-prescribed.

E Valsartan

Like ACE inhibitors, ARBs increase the risk of retention of lithium, significantly raising the risk of lithium toxicity in patients where they are co-prescribed.

A 42-year-old homeless man presents to the Emergency Department. Four hours previously, he had been seen in his normal state.

On admission, he has Glasgow Coma Scale (GCS) score of 4, is afebrile, pulse 80 bpm, blood pressure 60/30 mmHg and RR 24/min. his pupils are dilated and unreactive. His fundi have blurred disc edges, and his breath smells sweet.

Investigations:

Urinalysis	ketones +
Glucose	3.0 mmol/l
Lactate	4.0 mmol/l
Plasma osmolar gap	34
Na^+	141 mmol/l
K^+	3.2 mmol/l
Urea	9.0 mmol/l
Creatinine	250 µmol/l
Chloride	107 mmol/l
Bicarbonate	14 mmol/l
Calcium	2.28mmol/l
Prothrombin time	13.1 s
Salicylate	Not detected
Arterial blood gas (ABG)	$p_a(O_2)$ 13.0 kPa, $p_a(CO_2)$ 2.0 kPa

What is the most likely diagnosis?

A Lactic acidosis

B Methanol poisoning

Question 58 of 83

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What is the most likely diagnosis?

A Lactic acidosis

B Methanol poisoning

C Paracetamol poisoning

D Ethylene glycol poisoning

E Diabetic ketosis

B Methanol poisoning

This man has presented with sudden onset of collapse and a profound metabolic acidosis with a prolonged anion gap. The normal blood glucose precludes diabetic ketoacidosis, and lactic acidosis requires, by definition, a lactate of 5.0 mmol/l. Paracetamol poisoning can lead to coma and a metabolic acidosis, but here the rapidity of onset (with no evidence of encephalopathy 4 h previously) and normal coagulation are not supportive of the diagnosis. A high anion gap and high plasma osmolar gap point towards an ingested exogenous osmolar agent. The disc changes and normal calcium point towards methanol over ethylene glycol as a causative agent and this could be confirmed with methanol levels. The urgent treatment required is intravenous ethanol ± haemodialysis but even with rapid treatment sight loss is common. Where available, fomepizole is a reasonable alternative, and has the advantage that it does not lead to depression of consciousness.

A Lactic acidosis

Lactic acidosis is more likely to be associated with metformin use in the context of renal impairment.

C Paracetamol poisoning

A normal prothrombin time in the context of significant metabolic acidosis makes paracetamol overdose unlikely, as significant impairment of liver synthetic function would be expected.

D Ethylene glycol poisoning

Ethylene glycol poisoning, in contrast to methanol poisoning, is not associated with optic atrophy.

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Diabetic ketoacidosis presenting as a new diagnosis in a man of 42 would be less likely than a methanol overdose, particularly given the optic disc changes.

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9852

Question 59 of 83

A 64-year-old man is admitted to the Emergency Department with a cough productive of green sputum and a severe deterioration in cough and shortness of breath related to underlying chronic obstructive pulmonary disease (COPD). He normally takes tiotropium and high-dose Seretide® and, at best, his peak expiratory flow rate (PEFR) is 260. Today he is only able to manage 140. He continues to smoke 15 cigarettes per day.

On examination, his blood pressure (BP) is 152/72 mmHg and pulse 85 bpm and regular, and his temperature is 37.9 °C. There is poor air entry and wheeze throughout both lung fields, and an area of crackles at the right base. Oxygen saturation on pulse oximetry is 91%. He is allergic to penicillin.

Investigations:

Haemoglobin (Hb)	13.8 g/dl
White cell count (WCC)	14.1 × 10^9/l
Platelets (PLT)	200 × 10^9/l
Sodium (Na)	137 mmol/l
Potassium (K)	4.9 mmol/l
Creatinine (Cr)	115 µmol/l
C-reactive protein (CRP)	245 mg/l
Chest X-ray	Changes consistent with COPD and consolidation at the right base

He is treated with nebulisers and corticosteroids.

Which of the following is the most appropriate antibiotic therapy?

Rana Alnasser's screen

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C-reactive protein (CRP)	245 mg/l
Chest X-ray	Changes consistent with COPD and consolidation at the right base

He is treated with nebulisers and corticosteroids.

Which of the following is the most appropriate antibiotic therapy?

A	Piperacillin with tazobactam (Tazocin®)
B	Co-amoxiclav
C	Cephalexin
D	Clarithromycin
E	Ciprofloxacin

D Clarithromycin

The answer is Clarithromycin (Option D).

This man has evidence of a community-acquired pneumonia on top of underlying COPD. As he is penicillin-allergic, a macrolide, such as clarithromycin, is the next most logical step. Where clarithromycin is prescribed against a background of theophylline, this should be discontinued during the course of antibiotics. Another option would be doxycycline - not because of his underlying COPD, but rather due to a diagnosis of community-acquired pneumonia with a background of penicillin allergy.

A Piperacillin with tazobactam (Tazocin®)

Piperacillin with tazobactam (Tazocin®) (Option A) is incorrect.

Tazocin® contains a penicillin and would therefore be inappropriate. It is also not indicated for community-acquired pneumonia, unless there is evidence of *Pseudomonas*.

B Co-amoxiclav

Co-amoxiclav (Option B) is incorrect.

Co-amoxiclav is not appropriate because of the history of penicillin allergy reported here.

C Cephalexin

Cefalexin (Option C) is incorrect.

There is 20% cross-over between penicillin and cephalosporin allergy, and cephalosporins are not as effective as clarithromycin in this situation.

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There is 20% cross-over between penicillin and cephalosporin allergy, and cephalosporins are not as effective as clarithromycin in this situation.

E Ciprofloxacin

Ciprofloxacin (Option E) is incorrect.

Ciprofloxacin is a potential therapy for COPD exacerbation but is not recommended for the treatment of pneumonia.

You are reviewing what drug interaction trials are required for a new inhaled agent for the treatment of chronic obstructive pulmonary disease (COPD).

You feel that it has partial beta-agonist and partial anticholinergic activity.

When reviewing the list of agents which might require an interaction study, which of the following has a short persistence in plasma, but a much more prolonged duration of action?

A	Dopamine
B	Adenosine
C	Noradrenaline
D	Enalapril
E	Salbutamol

32705

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Your answer was correct

A	Dopamine
B	Adenosine
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D	Enalapril
E	Salbutamol

Explanation

D Enalapril

Agents which are administered as a pro-drug and metabolised to an active agent fulfil this category. Enalapril is rapidly metabolised to enalaprilat, the active agent which lowers blood pressure. Highly tissue bound agents also have a short half-life in plasma but a much more prolonged

D Enalapril

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A Dopamine

Dopamine has a short half-life of approximately 2 minutes and a duration of action of 10 minutes.

B Adenosine

Adenosine has a half-life of only 10 seconds and a duration of action of only 2-3 seconds at most, accounting for its use as an agent to induce transient heart block.

C Noradrenaline

Noradrenaline has a half life of 2-2.5 minutes and a short duration of action, accounting for its administration as an infusion.

E Salbutamol

Salbutamol has a half life of 4-6 hours and a similar/slightly shorter duration of action.

Question 61 of 83

A 46-year-old man, who you have seen begging outside the station, is brought to the Emergency Department by ambulance. He is unconscious and hyperventilating.

The nurses tell you that he is frequently admitted intoxicated, has a history of cataracts potentially related to previous methanol ingestion and has suffered epileptic seizures, which have precipitated several hospital admissions.

On examination is blood pressure (BP) is 100/70 mmHg, with pulse is 100/min regular. Unusually, there is no smell of alcohol. He has crackles on auscultation of both lung fields consistent with cardiac failure. When you try and wake him, he just groans and tries to turn over. You notice that he has nystagmus.

Investigations;

Hb	11.0 g/dl
WCC	11.0 × 10^9/l
PLT	190 × 10^9/l
Na^+	139 mmol/l
K^+	5.9 mmol/l
Creatinine	195 µmol/l
Cl^-	92 mmol/l
Bicarb	12 mmol/l
pH	7.1
Glucose	12.2 mmol/l

Which of the following is the most likely diagnosis?

A Diabetic ketoacidosis

B Phenytoin overdose

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Which of the following is the most likely diagnosis?

A	Diabetic ketoacidosis
B	Phenytoin overdose
C	Metformin overdose
D	Ethanol intoxication
E	Ethylene glycol intoxication

E Ethylene glycol intoxication

Ethylene glycol intoxication presents with decreased consciousness level, severe high anion gap metabolic acidosis and renal, respiratory and cardiac failure. Multi-organ failure is thought to occur at least in part due to widespread deposition of calcium oxalate crystals around 12 h after the initial insult. Inhibition of alcohol dehydrogenase by either ethanol or fomepizole, if available, is the mainstay of therapy. High-dose thiamine and pyridoxine should also be used as this reduces the formation of oxalate from glyoxylic acid. Because of the potential formation of calcium oxalate, calcium levels should also be assessed. Unfortunately, with delayed presentation, ingestion of relatively small amounts of ethylene glycol is fatal.

A Diabetic ketoacidosis

Given there is only a modest increase in glucose, this is inconsistent with a diagnosis of diabetic ketoacidosis.

B Phenytoin overdose

Although there is nystagmus, this is more likely to be related to chronic alcoholism and optic atrophy from methanol overdose.

C Metformin overdose

Because we aren't given a clear history of a previous diagnosis of diabetes mellitus, metformin overdose is unlikely as the driver for his presentation.

D Ethanol intoxication

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C	Metformin overdose

Because we aren't given a clear history of a previous diagnosis of diabetes mellitus, metformin overdose is unlikely as the driver for his presentation.

D	Ethanol intoxication

The clue here is the lack of a smell of alcohol, which doesn't fit with alcohol intoxication.

Question 62 of 83

An 18-year-old male is brought to the Emergency Department from the beach in Cornwall where he had gone for a swim. While wading in the water he developed a sudden, agonising pain in his right sole. He immediately aborted his idea to swim as he had become nauseated and vomited. The paramedic found a hot, red swelling on his sole and a foreign body, which he could not remove, and hence rushed him to the hospital.

On examination, the patient was profusely sweating. Blood pressure was 90/60 mmHg, pulse rate was 42/min, respiratory rate was 28/min and he had drooling of saliva. During the evaluation, he suffered a generalised tonic-clonic seizure.

Which of the following is an important initial management step?

A Antitoxin for Clostridium tetani

B Immersion of the limb in cold water

C Hyperbaric oxygen therapy

D Local hydrogen peroxide application

E Atropine for bradycardia

32850

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Your answer was incorrect

A	Antitoxin for Clostridium tetani
B	Immersion of the limb in cold water
C	Hyperbaric oxygen therapy
D	Local hydrogen peroxide application
E	Atropine for bradycardia

Explanation

E Atropine for bradycardia

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E Atropine for bradycardia

The south-western British coast is well known for stings by venomous fish like rays, weaver fish, etc. Most fish stings are inflicted on the soles of the feet of people wading near the shore. Fatalities are, however, rare. The sting causes an immediate sharp, agonising pain and the hot erythematous swelling extends up the limb. Local complications include tissue necrosis and secondary infection. This is more common if the spine remains embedded in the wound, as was seen in this patient. Patients stung by rays or stone fish may develop systemic symptoms with signs of autonomic stimulation and convulsions. Treatment includes immersion of the affected limb in warm water. The venomous spine has to be removed immediately. Severe hypotension may require atropine for bradycardia, and potentially SC or IM adrenalin if the initial response is poor.

A Antitoxin for Clostridium tetani

Tetanus is associated with slowly progressive muscular paralysis rather than the rapid deterioration with symptoms of hypotension and bradycardia seen here.

B Immersion of the limb in cold water

Immersion of the limb in warm water leads to denaturation of any toxin.

C Hyperbaric oxygen therapy

It's not hypoxia that is driving the circulatory symptoms seen here, but they are in fact related to the autonomic effects of any toxin.

D Local hydrogen peroxide application

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It's not hypoxia that is driving the circulatory symptoms seen here, but they are in fact related to the autonomic effects of any toxin.

D Local hydrogen peroxide application

Hydrogen peroxide is an oxidising agent used in wound cleaning. It doesn't have a significant role in the treatment of fish barb injury.

A 70-year-old man has been admitted to the Coronary Care Unit late in the evening.

Past medical history includes diabetes, glaucoma, hypertension, angina, transient ischaemic attacks and peripheral vascular disease.

He had collapsed at home and, on arrival to hospital, was in complete heart block. After a few attempts, a transvenous pacing wire was inserted in the right internal jugular vein.

During the night shift, the ward staff become concerned as his condition has deteriorated. He is complaining of a severe left frontal headache with associated nausea and vomiting. He also has blurring of vision in his left eye and has noted some flecks of bright red blood in his vomit.

His temperature is 36.9 °C, pulse 90/min regular, blood pressure 180/94 mmHg, respiratory rate 22/min.

Examination reveals a fixed dilated pupil on the left side. There is no other focal neurology. His abdomen is soft.

What medication is likely to benefit this patient?

A	Nitroprusside
B	Labetalol
C	Acetazolamide
D	Omeprazole
E	Aspirin

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Explanation

C Acetazolamide

Acetazolamide is a carbonic anhydrase inhibitor and has found use in the treatment of glaucoma and mountain sickness. This patient has been admitted with symptomatic complete heart block and would most likely have received

C Acetazolamide

Acetazolamide is a carbonic anhydrase inhibitor and has found use in the treatment of glaucoma and mountain sickness. This patient has been admitted with symptomatic complete heart block and would most likely have received atropine till the temporary pacing wire could be placed. Atropine is an anti-muscarinic drug, and in the eye it causes dilation of the pupil (mydriasis) and cycloplegia of the ciliary body. As a result it increases the risk of glaucoma with symptoms of localised frontal headache, blurring of vision, nausea and vomiting. The eye affected will classically have a fixed, dilated pupil with corneal oedema and peri-corneal ciliary injection. The treatment includes topical beta-blockers (timolol), which can be systemically absorbed, acetazolamide and topical pilocarpine. Acetazolamide can cause a normal anion gap acidosis. The patient will require measurement and monitoring of the intraocular pressure by an ophthalmologist.

A Nitroprusside

Nitroprusside acts as a nitrate donor and is a vasodilator. As such, its main role is in the treatment of hypertension rather than acute glaucoma.

B Labetalol

Although labetolol will achieve some exposure when given systemically to the eye, it may precipitate a worsening of heart block when given so soon after the transient episode.

D Omeprazole

Omeprazole does not have a significant impact on acute

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D Omeprazole

Omeprazole does not have a significant impact on acute glaucoma, the most likely diagnosis here.

E Aspirin

Anti-platelet agents don't impact on acute glaucoma, and the patient is already likely to have been treated with an adequate dose of anti-platelet therapy.

A 44-year-old man with polycystic kidney disease underwent renal transplantation three months ago. He was receiving ciclosporin, prednisolone, ramipril, hydrochlothiazide and atorvastatin. He had also received tacrolimus (FK-506). He was admitted with a history of headache, vomiting, confusion and bilateral visual loss. One single generalised seizure was reported at the onset, 2 days ago.

On examination, his pulse was 112/min, blood pressure 220/120 mmHg. He was disoriented and uncooperative. Bilateral papilloedema was seen, with exudates and rounded haemorrhages. He had perception of light at about 10 cm. Pupils were 2.5 mm and reactive to light. Lateral gaze was restricted on both sides. He was moving all his limbs and plantars were extensor.

Magnetic resonance imaging (MRI) of the brain revealed a bilateral increase in T2 signal intensity in the white matter, concentrated in the posterior part of the hemispheres, and a corresponding reduced density on computed tomography (CT) scan.

What is the best term to describe this clinical syndrome?

A Acute diffuse toxic encephalopathy

B Acute toxic metabolic encephalopathy

C Ischaemic encephalopathy

D Reversible posterior leuko-encephalopathy

E Necrotising leuko-encephalopathy

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D Reversible posterior leuko-encephalopathy

A posterior leuko-encephalopathy, which resembles hypertensive encephalopathy, may follow the use of several drugs like cyclophosphamide, ciclosporin, tacrolimus, cisplatin, cytarabine or IV methotrexate. It presents with headache, vomiting, seizures and cortical blindness. It has been suggested that ciclosporin alters the blood-brain barrier, and the fluid overload and hypertension that accompany the use of ciclosporin underlie the radiological changes. The imaging characteristics mentioned above are due to accumulation of fluid. It is, however, devoid of any mass effect. Review of his immunosuppressive therapy and substitution of an alternative regimen is the management of choice here.

A Acute diffuse toxic encephalopathy

Acute diffuse toxic encephalopathy is associated with generalised changes on the MRI, and is with exposure to organic solvents and heavy metals.

B Acute toxic metabolic encephalopathy

Given the history of multiple medications including immunosuppressants, acute metabolic encephalopathy, related to alcoholism or electrolyte disturbances is less likely versus reversible posterior leuko-encephalopathy.

C Ischaemic encephalopathy

Ischaemic encephalopathy is associated with a significant interruption in brain perfusion, due to substantial blood loss, cardiac arrest or hypoxia, and diffuse changes are noted rather than the specific posterior changes seen here.

Question 64 of 83

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C	Ischaemic encephalopathy

Ischaemic encephalopathy is associated with a significant interruption in brain perfusion, due to substantial blood loss, cardiac arrest or hypoxia, and diffuse changes are noted rather than the specific posterior changes seen here.

E	Necrotising leuko-encephalopathy

Necrotising leuko-encephalopathy is associated with diffuse white matter changes, as opposed to the predominantly posterior hemisphere changes seen here.

A 47-year-old woman presents following a self-terminating tonic-clonic seizure. She admits to regularly abusing benzodiazepines and opiates. She recently changed her general practitioner (GP), as her previous one refused to prescribe her the 60 mg diazepam and 180 mg of dihydrocodeine she takes a day. She does not drink alcohol and has not been known to abuse other prescription medications.

Examination in the Emergency Department is unremarkable.

Which of the following is the most appropriate intervention?

A	Intravenous (iv) Lorazepam
B	Oral carbamazepine
C	iv Naloxone
D	iv diazepam
E	Oral methadone

D iv diazepam

This patient has suffered a seizure, most likely as a result of benzodiazepine withdrawal. Management of choice would be with a long acting benzodiazepam, such as diazepam, given intravenously initially and titrated to effect. It could then be switched to the oral preparation and a reducing dose regime established. In patients who have been using diazepam for a number of years, this may need to occur over as long a period as 8-12 weeks. Patients may well have to attend the pharmacy to collect a script on a number of occasions per week to prevent stock-piling or overdosing intentionally on the medication.

A Intravenous (iv) Lorazepam

iv lorazepam is usually reserved for refractory seizures associated with acute benzodiazepine withdrawal, and for patients suffering seizures who are withdrawing from alcohol.

B Oral carbamazepine

There is no indication for conventional anti-epileptic medication here, with a reducing dose of benzodiazepines the more appropriate option.

C iv Naloxone

iv Naloxone is used for acute opiate reversal in situations of respiratory arrest where airway support is not possible or not indicated.

E Oral methadone

Oral methadone is used in addiction programs to allow

A 36-year-old woman presents to her 34-week midwife visit complaining of a severe headache and worsening indigestion. She has been relatively well during her pregnancy, her blood pressure (BP) at booking was 115/72 mmHg.

On review on this occasion, her BP was elevated at 145/92 mmHg.

Investigations:

Hb	11.0 g/dl
WCC	5.4 × 10⁹/l
PLT	234 × 10⁹/l
Na⁺	140 mmol/l
K⁺	5.0 mmol/l
Cr	115 µmol/l
Urine analysis	Protein ++

Which of the following is the most appropriate course of action to control her blood pressure?

A	Methyldopa and outpatient review
B	Nifedipine and outpatient review
C	Admit for IV labetalol
D	Ramipril and outpatient review

On review on this occasion, her BP was elevated at 145/92 mmHg.

Investigations:

Hb	11.0 g/dl
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B	Nifedipine and outpatient review
C	Admit for IV labetalol
D	Ramipril and outpatient review
E	Valsartan and outpatient review

C Admit for IV labetalol

This woman has clinical symptoms and signs consistent with pre-eclampsia and, as such, IV labetalol is the only appropriate option from those given here. Usual dose is via a bolus and then 1 mg/kg/h. Of course, the only way to resolve the pre-eclampsia is to consider delivering the baby, and that would be the next course of action.

A Methyldopa and outpatient review

Oral methyldopa is an alternative for controlling gestational hypertension when oral labetalol is unsuitable.

B Nifedipine and outpatient review

Nifedipine, like methyldopa, is recommended as an alternative to labetalol for patients who cannot tolerate it.

D Ramipril and outpatient review

ACE inhibitor use in pregnancy is associated with increased risk of renal and skeletal abnormalities in the fetus.

E Valsartan and outpatient review

Like ACE inhibitors, ARBs are contra-indicated for use in pregnancy.

20629

An 18-year-old woman is bought to the Casualty Department by 'blue light' ambulance accompanied by her parents who are very concerned about her health. The problems began around 2 days ago when the patient was complaining of anorexia and nausea and had some vomiting. It was thought that she had a mild gastrointestinal infection, but over the next few days she started to complain of pain in her right upper abdomen and feeling very weak. The parents returned home from work an hour ago to find the patient unconscious, and immediately summoned an ambulance. The patient was previously medically fit and is not on any medications. She has no known allergies. She has just finished her A-level examinations and is currently awaiting the results, with offers from five universities.

On examination, she has a blood pressure of 80/40 mmHg, a pulse of 100/min, fullness and a response to pain in the right upper quadrant of her abdomen but no focal neurological signs. Urgent blood tests show raised deranged liver function tests characterised by a markedly raised AST, raised ALT and a raised ALP. Her coagulation tests show a raised APTT and a raised PT, but her sodium, potassium, urea and chloride levels are all normal; creatinine is elevated at 172 µmol//l.

What would be the most likely cause of these results?

A Paracetamol overdose
B Alcoholic hepatitis
C Aspirin overdose
D Acute viral hepatitis
E Fulminant Wilson's disease

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Question 67 of 83

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What would be the most likely cause of these results?

Your answer was correct

A	Paracetamol overdose
B	Alcoholic hepatitis
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Explanation

A Paracetamol overdose

Paracetamol is widely and easily obtainable, and it seems likely that this patient has bought over-the-counter tablets and stockpiled them, which has led to significant toxicity

Paracetamol is widely and easily obtainable, and it seems likely that this patient has bought over-the-counter tablets and stockpiled them, which has led to significant toxicity following massive overdose. This possibility should always be considered in a patient presenting late with significant hepatic and renal dysfunction.

B	Alcoholic hepatitis

Significant alcohol abuse doesn't fit with this patient's profile with a high level of school achievement, and earlier presentation with vomiting and liver dysfunction would be expected.

C	Aspirin overdose

Aspirin overdose is usually associated with acute presentation a few hours after overdose with vomiting, tinnitus and hyperventilation.

D	Acute viral hepatitis

Hepatitis A more usually presents with a flu-like illness and jaundice, accompanied by raised transaminases. Fulminant liver failure is virtually never reported.

E	Fulminant Wilson's disease

Presentation with acute liver impairment associated with Wilson's disease is rare. Patients in this age group usually present with asymptomatic elevation in transaminases or with neuropsychiatric manifestations of the disease.

An 18-year-old high-school student is seen as an emergency extra in your Neurology Outpatient Clinic. During the last week, she has had three falls at home and crashed the family car. Her mother, who accompanies her, is concerned because she 'has started to walk funny'.

She was previously fit and well and had a normal birth with no associated complications. She is on no medication and denies smoking or using alcohol or illicit drugs. Her father has epilepsy and her mother has type II diabetes mellitus and hypertension. One of her younger brothers had suffered from acute lymphoblastic leukaemia but is now in remission. She has recently broken up with her boyfriend of three years. She has a pet dog and a parrot. She is three weeks away from taking her A-level examinations.

On examination, she is restless and has a coarse tremor on movement. She is afebrile, pulse 64 bpm and regular, blood pressure (BP) 110/72 mmHg and respirations are 16 breaths/min at rest. Heart, chest and abdominal examinations are all normal.

On neurological examination, she has a broad ataxic gait, nystagmus, past-pointing and diplopia, which was not brought on with fatigue. The rest of the exam was normal.

Investigations:

Hb	12.6 g/dl
WCC	9.8 × 10^9/l
PLT	365 × 10^9/l
Na^+	129 mmol/l
K^+	4.5 mmol/l
Creatinine	84 µmol/l
Bilirubin	9.0 µmol/l
Urea	4.2 mmol/l

Question 68 of 83

Ca^{++}	2.21 mmol/l
Glucose	5.2 mmol/l
Albumin	42 g/l
ALT	429 U/l
ALP	121 U/l
GGT	512 U/l
CRP	< 5 mg/l
PT	12 s
APTT	31 s
TSH	1.02 mU/l
Free T_4	16.1 nmol/l
MCV	95.3 fl

CT head demonstrates a normal brain. No abnormalities seen on U/S liver and bile ducts are of normal calibre.

Which of the following is the most likely diagnosis?

A	Multiple sclerosis
B	Paraneoplastic cerebellar degeneration
C	Carbamazepine overdose
D	Autoimmune hepatitis
E	Chronic alcoholism

C Carbamazepine overdose

This young woman has had a couple of stressful life events. The clue in the history is that her father has epilepsy, so she has access to carbamazepine. Dose-dependent unwanted effects of carbamazepine include diplopia, nystagmus, ataxia and hyponatraemia. Hepatotoxicity, peripheral neuropathy (and, rarely, bone marrow depression) can occur.

A Multiple sclerosis

In MS, much more of a patchwork of symptoms would be seen, versus the specific cerebellar symptoms seen here. In addition, MS often presents with optic neuritis as the initial feature.

B Paraneoplastic cerebellar degeneration

PCD is a very rare condition associated with lung, ovarian and breast cancers, and Hodgkin's lymphoma. It is associated with anti-Yo antibodies.

D Autoimmune hepatitis

Autoimmune hepatitis may be associated with the abnormal liver function tests seen here, but would not usually be associated with the cerebellar signs which are reported.

E Chronic alcoholism

Chronic alcoholism seems unlikely given that she is a high academic achiever. The access to the carbamazepine, cerebellar signs and abnormal LFTs fit better with this as the cause of her symptoms.

Question 69 of 83

A 52-year-old woman with a long history of anxiety and depression is brought into the Emergency Department at 0900 h by her husband, following a suspected overdose. He had found her slumped in a chair downstairs with two empty medication bottles on the floor. He had last seen her at 2300 h the previous night when they had gone to bed.

On examination, she was drowsy but rousable with a Glasgow Coma Scale (GCS) of 12/15. Her pulse was 130 bpm and her blood pressure was 90/60 mmHg. Her skin was hot and dry and she had dilated pupils. She had occasional jerky movements of her limbs and extensor plantar responses.

Results of investigations are below:

Arterial blood (on air):

pH	7.185
$p(O_2)$	7.2 kPa
$p(CO_2)$	3.2 kPa

Electrocardiogram (ECG)	Sinus tachycardia, widened QRS complex
Bicarbonate	15 mmol/l
Na^+	142 mmol/l
K^+	3.7 mmol/l
Urea	5.2 mmol/l
Creatinine	100 µmol/l

An IVI is commenced; which of the following is an appropriate next step?

A IV naloxone

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An IVI is commenced; which of the following is an appropriate next step?

A	IV naloxone
B	Immediate intubation and transfer to the intensive therapy unit (ITU)
C	IV sodium bicarbonate
D	IV flumazenil
E	IV amiodarone

C IV sodium bicarbonate

This patient has the signs of tricyclic antidepressant (TCA) poisoning. Other features include dry mouth, urinary retention, skin blistering, hypothermia, ataxia, nystagmus and hyperreflexia. Seizures occur in 10% of cases. Deep coma and respiratory depression may ensue. Cardiac arrhythmias can occur due to a quinidine-like type Ia effect on myocardium. After clearing the airway and maintaining adequate ventilation, the most important initial steps are to correct acidosis with sodium bicarbonate and relieve hypoxia. These measures can help to prevent arrhythmias without the need for anti-arrhythmic drugs.

A IV naloxone

Naloxone is used to reverse the effects of opiate toxicity and does not have a role here.

B Immediate intubation and transfer to the intensive therapy unit (ITU)

Although this patient requires early ITU involvement and monitoring in a high-dependency area, immediate intubation is not indicated (no profound hypoxia or hypercapnia). In total, tricyclic coma may last 24-48 h. Delirium and hallucinations may persist for 2-3 days and often require sedation with diazepam.

D IV flumazenil

This is used to reverse benzodiazepine toxicity and in this situation may increase the risk of seizures; as such it should be avoided.

E IV amiodarone

You are called to the Emergency Department to assist in the management of a 30-year-old man who has been brought in by a friend.

On examination, he is agitated and confused, with dilated pupils, is rather tremulous, sweating and grinding his teeth. He has a regular heart rate of 120 beats/min and a temperature of 38.5 °C. There is little previous history, although the friend believes that he has suffered from depression for a number of years and recently had his medications changed by his general practitioner.

What is the most likely diagnosis?

A Neuroleptic malignant syndrome
B Serotonin syndrome
C Malignant hyperthermia
D Thyrotoxic crisis
E Carcinoid syndrome

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What is the most likely diagnosis?

Your answer was correct

A	Neuroleptic malignant syndrome
B	Serotonin syndrome
C	Malignant hyperthermia
D	Thyrotoxic crisis
E	Carcinoid syndrome

Explanation

B Serotonin syndrome

Serotonin syndrome is a cluster of symptoms and signs that occur usually when more than one drug is taken that increases the concentration of serotonin at the synaptic

B Serotonin syndrome

Serotonin syndrome is a cluster of symptoms and signs that occur usually when more than one drug is taken that increases the concentration of serotonin at the synaptic level, although it has been reported following overdose of selective serotonin reuptake inhibitors (SSRIs) alone. It may occur when SSRIs are taken in combination with monoamine oxidase inhibitors or tricyclic antidepressants. If changing from one drug to another, a washout period is often required to prevent the syndrome from occurring. Treatment initially is to stop the causative drug(s), and prevent complications such as kidney disease caused by rhabdomyolysis.

Severe cases may require a general anaesthetic and muscle paralysis, and dantrolene sodium has been used, which reduces calcium efflux from the sarcoplasmic reticulum, although more recent data no longer support its role in managing the condition.

A Neuroleptic malignant syndrome

Neuroleptic malignant syndrome is characterised by fever, muscle rigidity (lead pipe), altered mental status and autonomic dysfunction. The patient described here does not appear to have any generalised muscular stiffness, and so serotonin syndrome is much more likely than neuroleptic malignant syndrome.

C Malignant hyperthermia

Malignant hyperthermia is seen in response to inhalational anaesthetics, and is genetic in origin.

D Thyrotoxic crisis

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D Thyrotoxic crisis

There are no symptoms of thyrotoxicosis which predate this acute presentation, and the recent change of medication is a better pointer to serotonin syndrome.

E Carcinoid syndrome

Carcinoid syndrome presents with gradually progressive diarrhoea, weight loss and episodes of flushing, usually in patients significantly older than 30 years of age.

A top premier-league football manager recently expressed concern that some of the players had abnormally high red cell counts - a sign of using erythropoietin (EPO). He bemoaned the fact that EPO had been administered to some players by their former clubs outside the UK and they actually took the drug unknowingly.

What is the best way of detecting EPO abuse?

A	It can be detected in urine for a few weeks following the most recent injection
B	It increases muscle bulk
C	It can be detected in saliva for a few days after the most recent injection
D	It can be detected in blood up to a week after the most recent injection
E	It can be detected by reticulocyte count for a few days after recent injection

2514

A It can be detected in urine for a few weeks following the most recent injection

Drug taking has become a big problem in all high-level sports: EPO was first introduced into the world of cycling in the late 1980s. By increasing the red cell mass, and hence the oxygen-carrying capacity of the blood, EPO should increase performance during an all-out exercise. Currently, EPO testing has been greatly refined, and levels may be detected in urine for some time after administration. It can lead to a dose-dependent increase in blood pressure or aggravation of hypertension; isolated patients have suffered a hypertensive crisis with encephalopathy-like symptoms and generalised tonic-clonic seizures. There is also a risk of thrombosis, and deaths have been reported from its use.

B It increases muscle bulk

EPO has a positive effect on the oxygen carrying capacity of the blood, not muscle bulk.

C It can be detected in saliva for a few days after the most recent injection

EPO testing from saliva is under development, although currently urine testing is more reliable.

D It can be detected in blood up to a week after the most recent injection

Although EPO can be detected via blood sampling, urine testing is preferred because of infection risks associated with blood sampling.

E It can be detected by reticulocyte count for a few

A 50-year-old farmer is admitted with nausea, vomiting and diarrhoea. He had used some spray in his potato field about 6 h ago.

On examination, he was drowsy, agitated and profusely salivating. Pupils were small. Limbs were weak and flaccid. A plantar response could not be elicited. Cyanosis was evident and auscultation of the lungs revealed coarse crackles all over. He has been given atropine by ambulance staff and has oxygen *in situ*.

Investigations:

WCC	12×10^9/l
Glucose	15 mmol/l
Urea	6.0 mmol/l
Na^+	130 mmol/l
K^+	3.6 mmol/l
Urine glucose	++

What initial step would you take in the management of this patient?

A	Wash contaminated skin with soap and water
B	Perform gastric lavage
C	Consider immediate tracheostomy
D	Give edrophonium 10 mg IV
E	Give immunoglobulin IV

A Wash contaminated skin with soap and water

This farmer has inadvertently exposed himself to an insecticide which he had sprayed at his farm. He has developed features of inhibition of acetylcholinesterase and hence accumulation of acetylcholine at the central and peripheral nerve endings, including the neuromuscular junctions. Such an exposure is characterised by miosis, which remains an important sign associated with hypersalivation, chest tightness, sweating, nausea, vomiting and diarrhoea. Nicotinic effects follow, and include muscle fasciculation and flaccid weakness of limbs and respiratory muscles. Respiratory failure is exacerbated by pulmonary oedema. Coma and convulsions may occur. Glycosuria and hyperglycaemia also occur. Usually there is no ketonuria. Reduced plasma or preferably red cell cholinesterase activity confirms the diagnosis. Initial treatment includes removal of soiled clothing and washing the contaminated areas with soap and water. Injection of atropine 2 mg every 10–30 min until signs of atropinisation occur is useful, and this is accompanied by IV pralidoxime mesylate. This reactivates phosphorylated acetylcholinesterase and should be given to every symptomatic patient, along with atropine.

B Perform gastric lavage

Because the contamination here is via contaminated skin, gastric lavage has no value in the management of the condition.

C Consider immediate tracheostomy

Endotracheal intubation and mechanical ventilation may be needed, but this is only in the event that there is no response to atropine and pralidoxime.

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D Give edrophonium 10 mg IV

Edrophonium is a reversible cholinesterase inhibitor, which would actually worsen the symptoms of organophosphate poisoning seen here.

E Give immunoglobulin IV

IV immunoglobulin is the preferred intervention for Guillain-Barré syndrome, not the diagnosis here.

A 57-year-old man presents to the Emergency Department complaining of headache; his blood pressure is noted to be 210/100 mmHg.

Past history of note includes asthma, for which he takes a salmeterol/fluticasone combination inhaler and, apart from this, he has attended the general practitioner (GP) only infrequently.

Detailed examination reveals grade 3 hypertensive retinopathy, no focal neurological deficit and no blood pressure difference between arms. There are no heart murmurs. You elect to admit him for commencement of anti-hypertensive therapy.

Which of the following would be the most appropriate initial agent to trial him on?

A	IV labetalol
B	Oral metoprolol
C	Oral isosorbide dinitrate
D	Oral doxazosin
E	Oral amlodipine

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E Oral amlodipine

Explanation

E Oral amlodipine

E	Oral amlodipine

Unfortunately, severe hypertension presenting acutely with headache ± other symptoms is an area that is poorly served by clinical trials. Most studies are inadequately powered to deliver a definitive result as to which class of therapy is most appropriate, and there are no trials that adequately compare the superiority of intravenous (iv) versus oral therapy. In this case, the aim should be to reduce blood pressure by around 25% over the first hour.

A	IV labetalol

Given this patient's history of asthma, labetalol is best avoided given that alternatives exist.

B	Oral metoprolol

Metoprolol is longer acting, more difficult to titrate and runs the risk of worsening asthma. As such it should be avoided here.

C	Oral isosorbide dinitrate

Isosorbide dinitrate has limited effectiveness in the management of hypertension, and is more useful as an intervention for angina.

D	Oral doxazosin

This is usually considered a third or fourth-line intervention for hypertension, and is therefore not useful here versus other first-line interventions such amlodipine.

Question 74 of 83

A 17-year-old girl is reviewed in the Dermatology Clinic. She is feeling quite tearful as her acne has been particularly severe over the past few months. You are considering treating her with oral retinoid therapy.

Past medical history of note includes epilepsy, for which she takes carbamazepine; she has also been treated with tetracyclines intermittently. She is currently using the combined oral contraceptive pill. You elect to begin therapy with isotretinoin.

Which of the following is the most important step before commencing isotretinoin?

A Warn her she will need to reduce her dose of carbamazepine

B Arrange a pregnancy test

C Do baseline liver function tests

D Do baseline renal function tests

E Warn her about the possibility of mood changes

18521

Question 74 of 83

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C	Do baseline liver function tests
D	Do baseline renal function tests
E	Warn her about the possibility of mood changes

Explanation

B Arrange a pregnancy test

Isotretinoin is highly effective for treating acne vulgaris. It is a synthetic 13-cis isomer of naturally occurring trans-retinoic acid. It decreases sebum production and sebaceous gland size. It is highly teratogenic, and female [illegible] have a negative pregnancy

B Arrange a pregnancy test

Isotretinoin is highly effective for treating acne vulgaris. It is a synthetic 13-cis isomer of naturally occurring trans-retinoic acid. It decreases sebum production and sebaceous gland size. It is highly teratogenic, and female patients using the drug must have a negative pregnancy test and commit to effective contraception for at least one month pre-treatment and for at least one month after the cessation of therapy.

A Warn her she will need to reduce her dose of carbamazepine

Isotretinoin has been known to reduce the plasma concentration of carbamazepine, so it is important to monitor impact on seizure control; however, still the most important intervention is to exclude pregnancy prior to starting treatment.

C Do baseline liver function tests

Both liver function tests and fasting lipids are recommended before starting therapy, although they are still trumped in importance by a pregnancy test.

D Do baseline renal function tests

Only baseline liver function tests and lipids are mandated before therapy.

E Warn her about the possibility of mood changes

Mood changes are possible, but pregnancy testing is still the crucial step before starting therapy.

A 65-year-old woman is admitted with a swollen left leg which, on venous Doppler, proved to be due to deep venous thrombosis (DVT). She was started on low-molecular weight heparin.

The next day, she had an episode of left-sided chest pain and coughed up blood. A ventilation–perfusion scan demonstrated an area of low perfusion.

Five days later (the day after discharge), she developed central chest discomfort and a painful swollen right lower limb.

Investigations:

WCC	12 × 10^9/l
PLT	45 × 10^9/l
APTT	30 s

What is the likely cause of this new problem?

A	Spontaneous right limb DVT
B	Cardiac embolism
C	Ruptured right Baker's cyst
D	Heparin-induced thrombocytopenia
E	Rupture of the right calf muscle

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Question 75 of 83

Explanation

D Heparin-induced thrombocytopenia

Heparin-induced thrombosis is the most likely diagnosis here, although it occurs much more infrequently with low-molecular weight heparin than with unfractionated heparin. It is prudent not to miss this diagnosis since the treatment is to withhold heparin. Heparin-induced thrombocytopenia (HIT) with a new thrombosis is a clinical diagnosis and should be identified when the above clinical features are witnessed, failing which the patient may progress to a fatal thrombosis. Type 1 HIT usually occurs in the first 48-72 h, and the platelet count rarely falls below 100 × 10^9/l. The platelet count should return to normal over the next 4 days and there is no increased risk of thromboembolism. Type 2 HIT is much rarer and usually occurs 5-10 days after treatment commencement, and the platelet count usually drops below 100 × 10^9/l to about 50 × 10^9/l. This case is therefore in keeping with type 2 immune-mediated HIT. Heparin should be stopped and alternative forms of anticoagulation may be required; for advice regarding best management, a haematologist should be consulted. Possible alternative forms of anti-coagulation would include lepirudin, argatroban or danaparoid. With regard to the timing of events, it is likely the PE is related to the original DVT, and the limb thrombosis to the HIT.

A Spontaneous right limb DVT

Given the timing, five days after commencing low-molecular weight heparin, a new spontaneous DVT is much less likely versus one related to HIT.

B Cardiac embolism

Cardiac embolism is associated with a cold, pulseless lower limb, rather than the appearance consistent with a DVT

A 52-year-old woman is brought to the Emergency Department by ambulance after being discovered by a male friend.

On examination, she has a Glasgow Coma Scale (GCS) score of 8, blood pressure (BP) 90/55 mmHg and a supraventricular tachycardia (SVT) with a rate of 160 bpm. There are a number of bottles of amitriptyline 75 mg tablets found empty in the house.

Investigations:

pH	7.15
pa(CO_2)	6.2 kPa
pa(O_2)	6.1 kPa

She is intubated and ventilated and admitted to the Intensive Care Unit (ICU).

Which of the following other measures is most appropriate in the management of this tricyclic overdose?

A	Verapamil IV
B	Sodium bicarbonate IV
C	Propranolol IV
D	Flecainide IV
E	Flumazenil IV

B Sodium bicarbonate IV

Death may follow as little as 1000 mg of tricyclic antidepressant overdose. QRS prolongation to >100 ms is an early sign of significant toxicity, while QRS prolongation >120 ms is associated with the risk of ventricular arrhythmias. Guidelines suggest that sodium bicarbonate is the most appropriate first-line intervention.

A Verapamil IV

Verapamil is associated with PR prolongation and is therefore not recommended for management of SVT in this situation.

C Propranolol IV

Propranolol is associated with QRS widening, which can actually increase the risk of arrhythmia in tricyclic anti-depressant overdose.

D Flecainide IV

Flecainide produces dose-related increases in the PR, QRS and QT intervals, again actually increasing the risk of rhythm disturbance in tricyclic anti-depressant overdose.

E Flumazenil IV

Flumazenil is used for reversal of benzodiazepine overdose, and in the situation of tricyclic antidepressant toxicity may actually increase the risk of seizures.

A 48-year-old man attends an Outpatient Clinic. He has a background of angina, hyperlipidaemia and hypertension. He gives a history of right upper quadrant abdominal pain, which is made worse on eating fatty foods. The pain has been severe enough for him to vomit.

What medication is most likely to increase symptoms of gall bladder disease?

A	Fenofibrate
B	Cholestyramine
C	Simvastatin
D	Niacin
E	Omega-3 fish acid

7059

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Question 77 of 83

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Your answer was incorrect

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C	Simvastatin
D	Niacin
E	Omega-3 fish acid

Explanation

A Fenofibrate

Fibrates activate lipoprotein lipase and lower triglyceride levels. They increase biliary excretion of cholesterol and predispose to the formation of cholesterol gallstones.

B Cholestyramine

Cholestyramine is a bile salt binder, preventing bile salts

A Fenofibrate

Fibrates activate lipoprotein lipase and lower triglyceride levels. They increase biliary excretion of cholesterol and predispose to the formation of cholesterol gallstones.

B Cholestyramine

Cholestyramine is a bile salt binder, preventing bile salts returning to the circulation via the enterohepatic circulation. This causes the liver to break down cholesterol. The main side effects are constipation and flatulence. It is now mainly used as a treatment for bile acid diarrhoea in patients with small bowel inflammatory disease.

C Simvastatin

Simvastatin is a HMG-CoA (3-hydroxy-3-methylglutaryl coenzyme A) reductase inhibitor. This enzyme catalyses the rate-limiting step in cholesterol synthesis of HMG-CoA to mevalonic acid. Side effects include myositis and deranged liver function tests.

D Niacin

Niacin inhibits adipose tissue lipolysis. Flushing and pruritus limit its use for many patients.

E Omega-3 fish acid

Omega-3 fatty acids either have no effect on the risk of gallstones or may slightly reduce the risk of them occurring.

You are asked to review gentamicin dosing in a 71-year-old man who is being treated post-abdominal surgery. He has a past medical history of hypertension and mild renal impairment. Current dose is 50 mg TDS.

Investigations:

		Normal Values
Haemoglobin (Hb)	12.1 g/dl	
White cell count (WCC)	12.2 × 10^9/l	
Platelets (PLT)	238 × 10^9/l	
Sodium (Na^+)	141 mmol/l	
Potassium (K^+)	4.8 mmol/l	
Creatinine (Cr)	142 µmol/l	
Pre-dose gentamicin (trough)	2.8 mg/l	0-2 mg/l
Post-dose gentamicin (peak)	7 mg/l	5-10 mg/l

Which of the following is the most appropriate course of action with respect to his gentamicin dosing?

A Stop the gentamicin

B Make the dose 50 mg BD

C Make the dose 75 mg BD

D Make the dose 150 mg OD

E Make the dose 25 mg TDS

D Make the dose 150 mg OD

The key points here are that there is scope to increase the dose of gentamicin, because the maximum peak level has not been reached, and that TDS dosing has resulted in trough levels which are too high. As such, the best option is potentially to keep the total daily dose the same but reduce the frequency of dosing to once per day.

B Make the dose 50 mg BD

This risks a fall in peak levels of gentamicin to below those for optimal drug exposure.

A Stop the gentamicin

Stopping the gentamicin risks a recrudescence of bacterial sepsis, and there is clear scope to manipulate the dosing regimen to achieve better trough levels.

C Make the dose 75 mg BD

BD dosing is unlikely to reduce trough levels of gentamicin to within target.

E Make the dose 25 mg TDS

Although this will reduce trough levels of gentamicin to within target, it will most likely mean that optimal peak levels are not achieved.

Haemoglobin (Hb)	12.1 g/dl	
White cell count (WCC)	12.2 × 10⁹/l	
Platelets (PLT)	238 × 10⁹/l	
Sodium (Na⁺)	141 mmol/l	
Potassium (K⁺)	4.8 mmol/l	
Creatinine (Cr)	142 µmol/l	
Pre-dose gentamicin (trough)	2.8 mg/l	0-2 mg/l
Post-dose gentamicin (peak)	7 mg/l	5-10 mg/l

Which of the following is the most appropriate course of action with respect to his gentamicin dosing?

Your answer was incorrect

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21177

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You are asked to review a 24-year-old woman with a history of epilepsy and learning difficulties. She takes a range of antiepileptics drugs (AED) and mood stabilisers.

On examination, she has a rash on her lower limbs that consists of a number of erythematous indurated papules and nodules. Biopsy of the lesions reveals extensive T-lymphocyte infiltration.

Which of the following is the most likely diagnosis in this patient?

A	Drug-induced pseudolymphoma syndrome
B	Cutaneous T-cell lymphoma
C	Drug-induced lupus
D	Lymphomatoid papulosis
E	Dermatitis herpetiformis

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Question 79 of 83

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- A Drug-induced pseudolymphoma syndrome
- B Cutaneous T-cell lymphoma
- C Drug-induced lupus
- D Lymphomatoid papulosis
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Explanation

A Drug-induced pseudolymphoma syndrome

Causes include AED (phenytoin, carbamazepine, lamotrigine and a number of other agents). A number of

A Drug-induced pseudolymphoma syndrome

Causes include AED (phenytoin, carbamazepine, lamotrigine and a number of other agents). A number of antibiotics, antiarrhythmics, antidepressants and antihistamines have also been implicated. Treatment involves discontinuation of all possible causative drugs. It is necessary to monitor resolution of symptoms as malignant transformation of skin lesions has been reported.

B Cutaneous T-cell lymphoma

Cutaneous T-cell lymphoma is a disease of the elderly and presents with chronic itching and widespread erythema.

C Drug-induced lupus

At least initially, drug-induced lupus would be expected to lead to an erythematous rash over sun-exposed areas rather than the generalised picture seen here.

D Lymphomatoid papulosis

In the event that we were not given the history of mood stabiliser and anti-epileptic use, lymphomatoid papulosis would be considered the main differential diagnosis.

E Dermatitis herpetiformis

Dermatitis herpetiformis is more likely to present with a blistering skin rash associated with neutrophil, rather than lymphocyte, infiltration.

A patient is admitted for treatment of multi-drug resistant tuberculosis. The patient is currently taking rifampicin, isoniazid and pyrazinamide. He is commenced on streptomycin.

What is the main concern with respect to streptomycin use?

A	Vestibular damage
B	Hepatic dysfunction
C	Optic neuropathy
D	Autonomic neuropathy
E	Peripheral motor neuropathy

6501

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Lymphomatoid papulosis | De…
dermnetnz.org

Lymphomatoid Papulosis: Re…
jamanetwork.com

Lymphomatoid Papulosis - Cli…
clinicaladvisor.com

Multiple erythematous papul…
researchgate.net

Figure 4 from Lymphomatoid …
semanticscholar.org

…الد = Lymphomatoid papulosis
dermaamin.com

Lymphomatoid Papulosis: Re…

A	Vestibular damage

Streptomycin is an aminoglycoside bactericidal antibiotic. It is used in the treatment of tularaemia and resistant mycobacterial infections. The most common neurological side-effect is vestibular damage causing persistent vertigo and vomiting. For this reason, ethambutol is usually added to tuberculosis regimes in preference to streptomycin.

B	Hepatic dysfunction

Aminoglycosides including streptomycin impact most on renal function and are a cause of neuropathy. They would not be expected to lead to significant hepatic dysfunction.

C	Optic neuropathy

Ethambutol is the agent associated with optic neuropathy.

D	Autonomic neuropathy

Isoniazid is recognised to result in peripheral, rather than autonomic neuropathy.

E	Peripheral motor neuropathy

Isoniazid results in peripheral neuropathy, the risk of which is partially ameliorated by pyridoxine supplementation.

A 68-year-old man woke up at 0800 h with right-sided weakness of his limbs and face. He was able to convey information by sign language and not able to speak. He was immediately brought to the Emergency Department by his wife within the next 15 min and is being assessed by you at 0900 h. He is treated with atenolol for hypertension

On examination, his pulse is 76/min and regular. All peripheral pulses are present, except both dorsalis pedis pulses. His blood pressure is 180/110 mmHg. He is drowsy and fundi reveal grade 2 hypertensive changes. He has an expressive dysphasia. Ocular movements are normal. A right-sided hemianopia is detected. The right-sided nasolabial fold is obliterated but he is able to close both eyes promptly. The right upper limb has power of 2/5 and lower limb 3/5. Right-sided tendon reflexes are sluggish with reduced muscle tone. The right plantar is extensor and the left is flexor. He has right-sided hemihypoaesthesia. There is no carotid bruit. S4 is audible on cardiac auscultation.

An urgent computed tomography (CT) of the head reveals a 'dot sign' in the left sylvian fissure. There is effacement of sulci over the left hemisphere.

What is the correct initial therapeutic approach for this patient?

A	Lower the blood pressure to 140/90 mmHg
B	Immediate IV thrombolysis
C	Intra-arterial thrombolysis
D	IV loading of heparin followed by a 24 hhr infusion
E	Aspirin 300 mg

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What is the correct initial therapeutic approach for this patient?

Your answer was incorrect

A Lower the blood pressure to 140/90 mmHg

B Immediate IV thrombolysis

Explanation

E Aspirin 300 mg

This patient has woken from sleep with symptoms of a stroke; as such, it's impossible to calculate the time since the stroke occurred, making it outside the window for thrombolysis. In this case, with the CT scan suggesting an embolic stroke and no sign of haemorrhage, moving to anti-platelet therapy is the next most important step.

B Immediate IV thrombolysis

Intravenous tissue plasminogen activator (t-PA) therapy is advocated only to patients within 4.5 h of the onset of a stroke; this recommendation comes from analysis of both the NINCDS and ECASS II studies.

A Lower the blood pressure to 140/90 mmHg

There is no evidence that benefit is derived from lowering blood pressure in this situation, and indeed it may cause harm because of extension of the infarcted area.

C Intra-arterial thrombolysis

For the same reason that IV thrombolysis isn't advocated here, intra-arterial thrombolysis doesn't have a role in the treatment of this patient.

D IV loading of heparin followed by a 24 hhr infusion

Heparin offers no advantage over aspirin with respect to neurological recovery, at the expense of increased risk of bleeding.

A 27-year-old woman, who is five months pregnant and allergic to penicillin, comes to the clinic complaining of a severe cough productive of rusty coloured sputum and marked shortness of breath.

On examination, she is pyrexial 38.3 °C, her blood pressure is 110/70 mmHg, her pulse is 89 bpm and her respiratory rate is 28/min. She has bronchial breathing over the right lower zone on auscultation.

Investigations:

Hb	11.6 g/dl
WCC	13.1×10^9/l
PLT	210×10^9/l
Na^+	138 mmol/l
K^+	4.3 mmol/l
Creatinine	90 µmol/l
Urea	8.3 mmol/l
Chest X-ray	Extensive right lower lobe consolidation

Which of the following is the most appropriate antibiotic choice for her?

A Doxycycline

B Clarithromycin

C Ciprofloxacin

D Cephalexin

E Olfloxacin

B Clarithromycin

Macrolide antibiotics are the preferred first-line agents for pneumonia in patients who are allergic to penicillin, including pregnant women. Dose frequency and GI tolerability mean that newer agents such as clarithromycin are preferred to erythromycin in later pregnancy. In early pregnancy use of clarithromycin may be associated with early fetal loss.

https://www.ncbi.nlm.nih.gov/pubmed/23301061

A Doxycycline

Tetracyclines are not recommended for use in pregnancy because of the risk of significant and permanent tooth discolouration.

C Ciprofloxacin

Quinolones are associated with increased risk of tendon rupture in animal models and cartilage abnormalities; they are not therefore recommended for use in pregnancy.

D Cephalexin

There is some crossover of allergy between penicillins and cephalosporins, and they are generally considered less effective than macrolides in the treatment of pneumonia.

E Olfloxacin

Olfloxacin, although it is a second-generation quinolone, is still associated with increased risk of tendon rupture.

A 60-year-old woman comes to the clinic. She has a background of chronic atrial fibrillation and diabetes. She i taking digoxin, warfarin and metformin.

The patient tells you that she has been feeling low in mood since her husband died, and has started taking St John's wort.

What is the patient at increased risk from?

A	Embolic stroke
B	Bleeding
C	Pancreatitis
D	Increased blood glucose
E	Hypomania

7060

A 60-year-old woman comes to the clinic. She has a background of chronic atrial fibrillation and diabetes. She i taking digoxin, warfarin and metformin.

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What is the patient at increased risk from?

Your answer was correct

A Embolic stroke

B Bleeding

C Pancreatitis

D Increased blood glucose

E Hypomania

Explanation

A Embolic stroke

St John's wort is a herbal remedy that is used by many for depression, anxiety or sleep disturbance. It is an enzyme inducer and will result in decreased prothrombin time in

A Embolic stroke

St John's wort is a herbal remedy that is used by many for depression, anxiety or sleep disturbance. It is an enzyme inducer and will result in decreased prothrombin time in patients taking warfarin. Hence the patient is at increased risk of embolic stroke. It can also cause photosensitivity and gastrointestinal upset. Young female patients who are also taking the combined oral contraceptive pill should be warned that St John's wort will interfere with their contraception.

B Bleeding

St John's wort is an enzyme inducer rather than inhibitor, and therefore results in a decrease rather than an increase in INR.

C Pancreatitis

Diabetes mellitus *per se* is associated with an increased ris of pancreatitis, and the use of St John's wort has no furthe impact on this level of risk.

D Increased blood glucose

Metformin is not metabolised via the P450 system, and St John's wort therefore has no effect with respect to increasing blood glucose.

E Hypomania

St John's wort is as effective as an SSRI in treating depression and does not increase the risk of hypomania in patients who take it.